Telecommunications Deployment Strategy

Main Report

A Key Strategy
in Southern
California's
Plan to Improve
Mobility and
Air Quality

SOUTHERN CALIFORNIA

ASSOCIATION of GOVERNMENTS

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Mission Statement

To enhance the quality of life of all Southern Californians by working in partnership with all levels of government, the business sector, and the community at large to meet regional challenges and to resolve regional differences.

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We hope that you enjoy this electronic visit to the Southern California Telecommunications Deployment Strategy Report.

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Exhibits List

INTRODUCTION

This document describes a strategy for accelerating the deployment and use of telecommunications in the six Counties and 184 cities of the Southern California Region. Telecommunications means electro-optical communication of voices, graphics, data, or video over a distance. The counties are Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura.

One might ask, isn't telecommunications (including telephones, cellular, faxing, video conferencing, computer networks, and cable TV services) advancing quite fast enough? The answer is "yes" if we are talking about all telecommunications. The answer is "no" if we are talking about the particular characteristic of telecommunications that motivates this plan: communicating over a distance can sometimes provide people and organizations with alternatives to vehicle travel, thus reducing the number of vehicle trips and their associated exhaust emissions and traffic congestion. This strategy provides a process for isolating and emphasizing those telecommunications applications — as well as the technological, organizational, economic, and human factors that influence applications — that can lead to more trip substitution, shifting of travel out of peak periods, and other positive impacts that will improve air quality.

In addition, there are other economic benefits to accelerating telecommunications deployment, benefits such as creation of more new jobs, and increasing the ability of Southern Californians to prosper in an increasingly competitive world economy.

How to Read This Document:

1- The Strategy:

The Southern California telecommunications Deployment Strategy (TDS) is described in detail in the main body of the document, which is on this CD-ROM; and in brief in the Executive Summary.

2- The Appendices:

Along with the development of this strategy, a Telecommuting Outreach Program, designed by the Los Angeles County Metropolitan Transportation Authority (LACMTA) for Los

Angeles County, is described in Appendix A. In addition, this Appendix A includes some of the products of the Outreach Program such as the news letters, and Chapter One of the Telecommuting - A Formula for Business Success manual. The other two Appendices describe information related to the TDS.

1. Telecommunications Background Overview & Issues Identification

Background

This document was prepared by consultants working under the direction of the Southern California Association of Governments, in support of the Southern California Economic Partnership. The consultant team from Ellen Williams and Associates, Inc. also benefited from review and advice from the Telecommunications Cluster Advisory Group of private and public sector managers, described below. The work that went into this document was partially funded by a contract between the Association and the State of California Department of Transportation.

The Association of Governments is a council of 184 city governments and six county governments serving 15 million people in 38,000 square miles of Southern California. It is the means by which local governments work in concert to solve problems that transcend political boundaries, such as mobility, access, air quality, and economic vitality. Under Federal law, Association of Governments has the assignment of planning the improvements to the regional system of transportation so that the system works to move people and goods efficiently, while at the same time complying with the

Federal Clean Air Act. The Association fulfills this planning responsibility with the creation of a Regional Transportation Plan, reviewed and updated every three years. All road, highway, and rail construction projects fall under this plan, as well as other measures, such as expanding public transportation, new traffic signal control systems, and promotion of alternatives to traveling. Until this plan was begun, the only application of telecommunications that was considered in the Regional Transportation Plan is telecommuting, which means using the telephone, computer networks, and other telecommunications to work at home instead of commuting.

The latest version of the Regional Transportation Plan, issued in June 1994, paints a picture of growing traffic congestion: "Transportation demands continue to increase rapidly in Southern California as a result of both population growth and changes in travel patterns. Given the financial restrictions and environmental concerns, it appears unlikely that this demand can be accommodated without dramatic changes in travel behavior."[1]

Exhibit 1 illustrates these points by showing the latest forecast for average daily vehicle trips in Southern California for the years ahead, out to

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Exhibit 1:
Baseline and Plan for Daily Vehicle Trips in Six Counties of Southern California
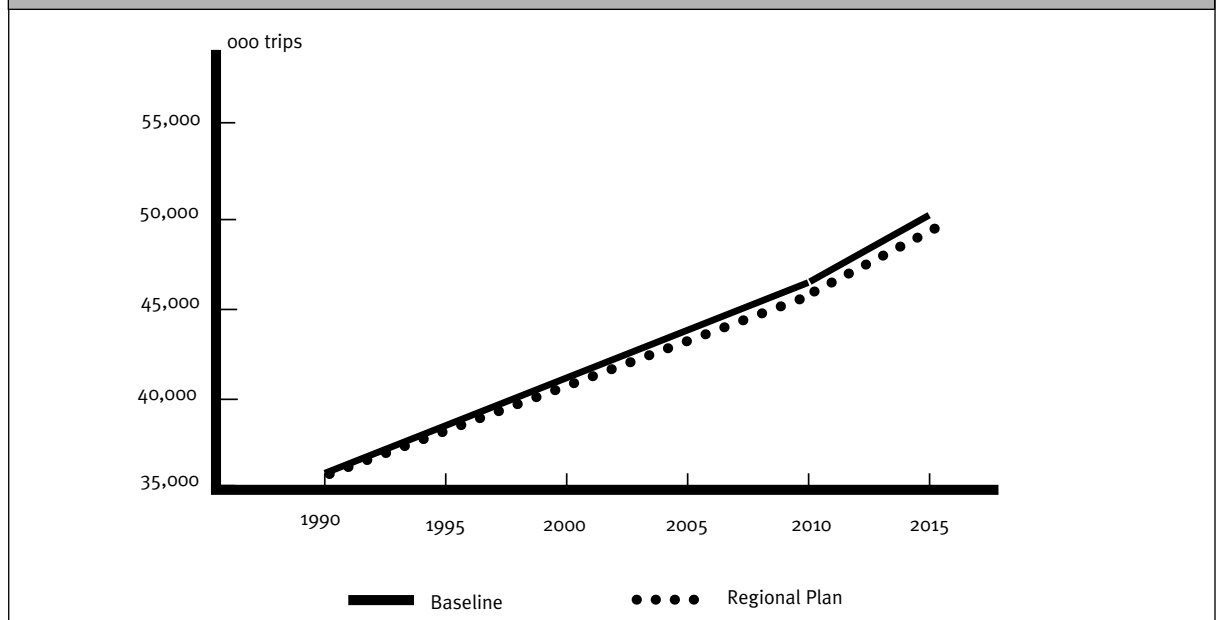
the year 2015. Note that the starting point for the growth shown is the 1990 average level of trips in the region: 35,416,000 trips per day! The solid line represents a forecast that assumes that there are no extraordinary public policy initiatives to reduce trip-making in the years ahead. The dotted line represents a forecast for a reduced amount of vehicle trips to result if the Regional Transportation Plan of new diamond lanes (HOV), more use of transit, road pricing, some more telecommuting, and other innovations is followed. The relatively small difference between the solid baseline and the dotted plan line -- about two percent in the year 2015 -- motivated the Association of Governments to seek additional useful steps to take, including the addition of Advanced Transportation Technologies to the Regional Transportation Plan, one of which is telecommunications.

As a partial response to the growing demand for vehicle travel which is causal to the severity of air pollution (the worst in the nation), as well as the increase in congestion in the Southern California region; the Southern California Economic Partnership was formed (The Partnership) by the Association of Governments as part of the 1994 Regional Transportation Plan. The Partnership is a business-government non-profit organization formed to accelerate the consumer use of five advanced transportation technologies: electric vehicles, alternative fuel vehicles, smart shuttle transit, intelligent transportation systems, and telecommunications. The Partnership's mission is to be a market development facilitator, helping the private sector to create a mass consumer market for technology based products that alleviate air pollution and traffic congestion, and produce local job growth and productivity improvement as well. The Partnership Board is composed of 26 members who are executives of private and public organizations which work on one or more of the five advanced transportation technology areas. **Exhibit 2** shows the members of this Board, and **Exhibit 3** provides the organizational structure of the Partnership.

The portion of the activity of the Economic Partnership that is directed toward telecommunications is called the Telecommunications Cluster, which operates in parallel with the Electric Vehicle Cluster, the Smart Shuttle Cluster, and the others. The Cluster is to do its work through a small staff of employees and contractors, plus a number of volunteer stakeholders from the private and public sectors whose organizations find participation to be useful to their mission. Note that the organizational mission in the case of government participants is some component of the public interest, while in the case of business organizations the mission is business related -- sales, serving customers, growth, shareholder value, profit, and so on.

This plan as well as the ongoing work of the Telecommunications Cluster is informed by expert input from an Advisory Group of telecommunications providers and government officials. **Exhibit 4** shows the charter members of the Advisory Group, which met six times in the period July, 1995 through January, 1996. This Advisory Group is scheduled to meet bimonthly starting in March of 1996. The membership of the Advisory Group is likely to change under the direction of Partnership management.

The Advisory Group and its meetings are an important part of the Cluster, but Cluster activity under this plan expands beyond the Advisory Group. A variety of future research and development projects that will be generated by this plan carried out by Partnership staff, Association staff, and contractors would also be part of the Cluster. Furthermore, in a way similar to the Smart Valley effort based in the Silicon Valley area of Northern California (see Appendix C), Cluster top management with the advice of the Advisory Group may choose to endorse and promote a number of ongoing telecommunications infrastructure upgrades or applications development projects taking place in the Southern California region. These projects could then be said to be "part of" the Telecommunications Cluster.

The California Department of Transportation (Caltrans) has a vision that Southern California driving can be improved considerably over the next ten years as a result of using advanced technologies. This agency sometimes refers to the use of telecommunications for trip substitution as telesubstitution. As one response to the challenge of rising travel demand and limited funds

Exhibit 2:
Southern California Economic Partnership

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Jim Wood
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Southern California Gas Company

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The Gas Company

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General Manager*
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Raymond Buttacavolli
Regional Manager
General Motors Corporation

A. J. Donner
Executive Director, Public Affairs
Pacific Telesis Group

Zahi Faranesh
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Planning*
Caltrans District 7

Jim Ortner
Manager Air Quality Program
Orange County Transportation
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Marketing Research Manager
Southern California Economic
Partnership

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                              │   Board of  │
                              │  Directors  │
                              └─────────────┘
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          ──────── Select Industry and Government Cluster Partnerships ────────
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Market Development Function:
Electric Vehicle Cluster · Alternate Fuel Vehicle Cluster · Smart Shuttle Cluster · IVHS Cluster · Telecommunications Cluster

Support-Enabling Function:
financial Advisor Cluster · Marketing Communications Cluster · Clean Cities Cluster · Ecomonic Project Clearinghouse Cluster

Activity Center Use:
Business Center Cluster · Shopping Center Cluster · Special Event Center Cluster · Airport-Transit Center Cluster · School Activity Center Cluster

for the construction of new roads and highways, public policy of the State of California is to work on increasing the use of telecommunications in order to move information instead of people and goods. Caltrans promotes the notion that telecommunications is a "mode of transportation" that moves information and services instead of people and goods. Caltrans is coordinating its own statewide telecommunications program with the Association and the Partnership, and has provided funding for the creation of this plan.

Other "telecommunications mobility projects" funded by Caltrans around the State of California include neighborhood telecenters, a community network serving Davis (see Appendix B), the Blue Line Televillage at the Compton transit center in Los Angeles, and a Smart Communities planning effort in San Diego County (see Appendix B & C). These projects are intended to provide research

findings on the demand for telecommunications as a mobility mode, demonstrate the value of the telecommunications mode as a component of a full transportation system, and solve problems in partnership with the private sector and units of local government.

Another organization that is working on telesubstitution is the Southern California Telecommuting Partnership, founded by a grant from the Department of Energy, as part of the response to the January 17, 1994 Northridge earthquake, which closed major arterials for a period of time. This Partnership (distinct from the Economic Partnership described above) is a voluntary confederation of public, non-profit, and private entities which have joined together to facilitate the growth of telecommuting. As of early 1996, because of a needs assessment carried out in 1994-5, the Telecommuting Partnership is

Charter Members of the Telecommunications Cluster Advisory Group of the Southern California Economic Partnership - Established July 1995	
Bill Allin	District Manager, AT&T, San Francisco
Sky Dayton	President and CEO, Earthlink Network Inc., Los Angeles
Dilara El-Assaad	Project Manager, Southern California Association of Governments
Donald Girskis	General Manager, Nextel Communications, Orange
Evelyn Gutierrez	Chief, Office of Special Programs, Chief Administrative Office, Los Angeles County
Chuck Haas	INTEL, Santa Clara
Jim Hake	Principal, Access Media, Santa Monica
Jorge Jackson	Vice President, GTE Telephone Operations, Thousand Oaks
Kimberly Karambelas	Vice President, Pacific Lightwave, Riverside
Dr. Douglas Martin	ADA Coordinator, ADA Compliance Office, UCLA, Los Angeles
Larry McElroy	Director of Business Development, Performigence, Los Angeles
Perry Parks	President, Southern California Cable Association
Hon. Robert Pinzler	Councilmember, Redondo Beach City Council, Redondo Beach
Gene Sherman	Vice President, Pacific Telesis, Los Angeles
Kathy Wasikowski	Director of Transportation Programs, Southern California Air Quality

engaged in developing a training and marketing program to expand telecommuting in the Southern California region.

Telecommuting is already the most familiar trip-saving application of telecommunications. It is important because the single largest identifiable trip purpose is the daily journey to work. However, this present plan needs to go beyond telecommuting, because the journey to work is only 21 percent of trips in Southern California.

This document describes the Southern California Telecommunications Deployment Strategy (TDS). This Strategy is intended to provide a framework for the activities of the staff and stakeholders whose work comprises the Telecommunications Cluster of the Southern California Economic Partnership. Staff includes paid professionals at the Partnership and at the Southern California Association of Governments. Stakeholders include members of the Telecommunications Cluster Advisory Group and other professionals from business and government organizations working on telecommunications. These people will be authorized by their organizations to participate in working groups and task teams that implement Partnership initiatives.

All of this work on telecommunications deployment for improved mobility and access is also intended by the founders of the Southern California Economic Partnership to promote the growth and development of the Southern California economy. There is in fact little doubt that telecommunications deployment of any and all kinds in a market-driven framework provides economic benefits, including the expansion and creation of new enterprises, and the creation of new jobs. At the same time telecommunications along with computers and other information technologies promotes restructuring of the economy and some "creative destruction" of enterprises and jobs as new technologies and processes replace older ones that are less efficient and effective. The effect of telecommunications on the economy is discussed in a later section.

The point to be made here is that economic benefit from telecommunications deployment is rela-

tively easy to achieve; it comes almost naturally as a matter of course. Mobility benefits, on the other hand, are harder to achieve. [5]. A narrower range of activities in telecommunications deployment promotes mobility enhancement than promotes economic development generally. That is the reason for the dominant and recurring focus on travel related issues in this Plan. Mobility enhancement is the narrower goal and will not be achieved automatically be promoting telecommunications infrastructure and applications generally. Once a plan for enhancing mobility through telecommunications is set in motion, the general economic benefits will also come along.

Overview and Issues Identification

At the same time that travel demand is rising steadily in Southern California, the power and reach of telecommunications is growing rapidly as well. Telecommunications encompasses the movement of voices, graphics, video, computer data, and other information over a distance using electromagnetic waves that travel through metal and glass cables or the air. Telephones, fax, broadcast and cable television, cellular, paging, computer communications like electronic mail

and Internet, video-conferencing, and the myriad of new services coming over the "information highway" are all part of telecommunications.

The graphics in **Exhibits 5** and **6** are just two out of many possible indications of the speed at which telecommunications technology is developing. The first figure illustrates the past and future growth in the power of microcomputers, which are essential components of modern telecommunications. The number of transistors on each chip is growing inexorably. The second figure illustrates the trend in dial-up data communications bandwidth -- expressed in bits per second -- available to homes and small businesses over the course of the 1990s. The 1990-96 figures represent typical modem speeds in each year, starting 2400 bits per second and progressing through 28,800 bits per second modems widely sold as of 1996 in computer stores and popular for Internet surfing. The 1998 figure represents the digital, no-modem connection speed of digital phone circuits (ISDN, integrated services digital network) that are growing in availability throughout California and elsewhere, and the year 2000 figure of 1.5 million bits per second represents an estimate of minimum data rates expected by many observers to be commonly available at the turn of the century through "cable modems" or other telecommunications technologies.

Exhibit 5:
Growing Number of Transistors in each Microcomputer Chip
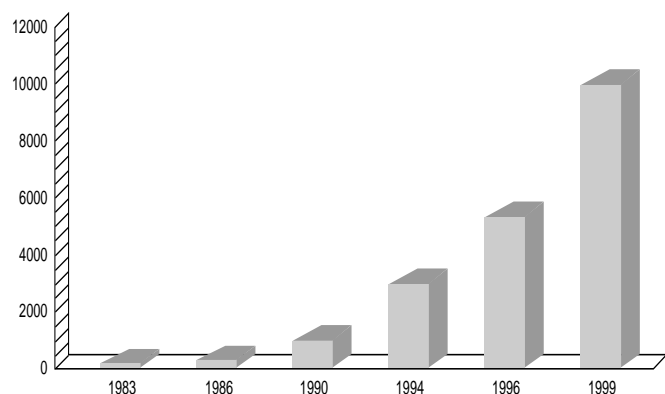
Source: Business Week, Feb. 20,1995, p. 88

Exhibit 6:
Typical Data Communications Speeds Available for Homes and Small Business
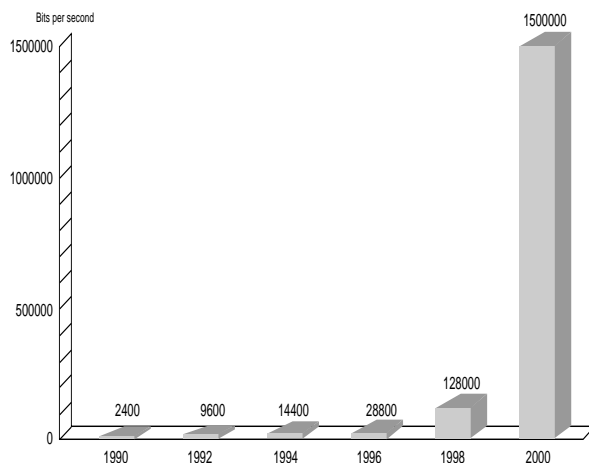
Source: Global Telematics

TELECOMMUNICATIONS

Telecommunications means interactive communications and other conveyance of information over a distance by electronic and optical means. Telecommunications can be used even over short distances, as in the case of intercoms, local area networks (LANs), cordless phones, private branch exchanges (PBX), and master antenna TV services in apartment buildings. However, the Telecommunications Cluster will focus on distances of at least 1000 feet, the approximate span at which people begin to use vehicles for movement instead of walking.[2]

At the other extreme, while telecommunications can reach around the globe and out into deep space, the focus for the present plan will be on telecommunications that allows information movement within the Southern California region, up to around 300 miles. At the same time it is usually impossible to limit how far telecommunications can reach. The power of telecommunications as a channel for exporting and importing goods and services to and from Southern California is a key characteristic, as is the power of long-distance communications to influence the flow of people visiting the region by car, train, plane, and ship. The long-distance reach of telecommunications also permits the outsourcing of work and the export of jobs from the region. Since long-distance communications beyond the boundaries of the Southern California region affects the movement of people and goods within the boundaries, it is a characteristic that will need to be remembered throughout the work of the Telecommunications Cluster, although the main Cluster emphasis is on shorter-range telecommunications applications.

The telecommunications system is a network of networks, including telephones, cellular phones, satellite dishes, cable TV, broadcast services, computer networks, and other systems. Telecommunications technologies includes all of the following products and services shown in **Exhibit 7**. In simple terms telecommunications is

Exhibit 7:
Telecommunications Technology Inventory

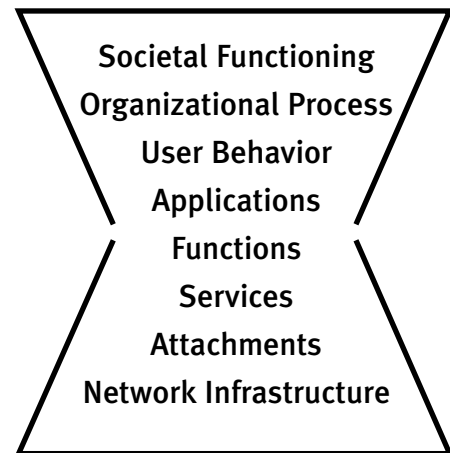|		
800/900 Services	Groupware	Printers
Asynchronous Transfer Mode	Imaging	Remote Access
Audiotex	Intelligent Hubs	Routers
Bridges	Internet Access Providers	Security Software
Celluar Equipment	Internet Software Tools	Site Metering
Centrex	Inverse Multiplexers	SMDS
Client-Server Applications	ISDN	SONET
Cluster Controllers	Leased Lines	Switched Data
Communications Software	Local Area Networks	Systems Management Software
Database Servers	Mainframe Computers	Terminal Emulation Software
Desktop Publishing	Microcomputers	Terminals
Document Management	Middleware	Videoconferencing
DSU/CSU	Minicomputers	Virtual Networks
Electronic Data Exchange	Modems	Voice Mail
Electronic Mail	Multimedia	VSAT and other Satellite
Fax/Modem Boards	Multiplexers	Web Servers and Browsers
Firewalls	Network Management Software	Wireless Data Services
Frame Relay	Notebook Computers	Wireless Data Equipment
FT-1, T-1, T-3 Services	On-line Services	Word Processing Software
Gateways	PBXs	Workstations
Graphical User Interface	Personal Digital Assistants	

the combination of five familiar systems, the switched voice-data- video telephone system, cable TV systems, cellular and other wireless communications systems, satellite systems, and broadcast TV and radio. Large organizations often have private communications systems of enormous size and complexity, parts of which are generally leased or otherwise sourced out to telephone companies and other common carriers.

Computing is increasingly converging on telecommunications, yielding an advanced telecommunications that some give a new name such as telematics or telecomputing. This convergence shows up in several ways:

◆ An increasing share of telecommunications content originates as computer data.

◆ Automated response systems, where callers press buttons to generate tones that cause information to be sent back, such as electronic touch-tone banking, amounts to using the telephone as a computer terminal.

◆ Most other telecommunications traffic (voice, video, graphics) is digitized via computers for fast transmission via fiber optics. This computerization of information sometimes includes encoding and decoding for security, compression to remove redundant information, and conversion to discrete packets of information for transmission. Newer, faster, higher capacity telecommunications services such as frame relay and asynchronous transfer mode depend utterly on computers

◆ For the management of telecommunications processes, including setting up end-to-end circuits via switching, coordinating the many antennas used by cellular telephones, and monitoring telecommunications network performance, computers are integral.

Telecommunications is best analyzed by a logical layering that separates narrower causes and larger effects. One possible model that divides telecommunications into layers has been developed by Global Telematics. See **Exhibit 8.** The model stacks the more fundamental parts of the telecommunications milieu, such as infrastructure and network attachments, at the bottom of an

Exhibit 8:
Layers of Telecommunications

Societal Functioning
Organizational Process
User Behavior
Applications
Functions
Services
Attachments
Network Infrastructure

hourglass-shaped stack. The model puts the enabled, resulting effects of telecommunications, such as societal functioning, toward the top. The reason for the narrowing in the middle of the stack is to make the point that the relationship between the technology issues that comprise telecommunications and the external issues that lie outside of telecommunications, such as mobility, is easiest to understand in the middle of the stack. The following description covers each layer of the model, starting at the bottom. [3]

TELECOMMUNICATIONS

Network infrastructure is the physical facilities of networks that allow information to flow from place to place. Examples of network infrastructure are copper and fiberoptic cables, switches, earth satellites, satellite dish antennas, and cellular telephone antennas

A key characteristic of infrastructure is bandwidth, which means the amount of information that can flow through a single point in a given period of time. Bandwidth is expressed in bits of information per second. Higher bandwidth means faster data transmissions and higher quality video and graphical representations. With wires and cables, this bandwidth increase is achieved by changing the material out of which cables are made, typically from copper to glass fiber. With radio systems, the bandwidth is increased by

using ever smaller, computer coordinated transmission areas called cells, and then using the same frequencies over and over again in different cells that are not adjacent. With all kinds of infrastructure, there is a general technological trend to squeeze more and more bandwidth capability out of existing facilities. This is done with better electronics, some of which is aimed at signal compression, which raises bandwidth by eliminating the transmission of redundant information.

Furthermore, more bandwidth is not always better than less bandwidth in practical applications of telecommunications. It is sometimes asserted blithely that video is invariably an important addition to telework and teleservice applications, and higher bandwidth is important in making person to person video communications work successfully. However, there are many kinds of workgroup and customer/client communications in which video is a distraction in remote interaction. This is obviously the case when communicating while driving a car. But even when sitting at a desk, pure voice communications, or voice plus document sharing, works better than video. Voice and document sharing are low bandwidth applications that work over the telephone infrastructure of today. As another example, research shows that certain kinds of psychological counseling are more effective when delivered over the telephone than in face-to-face sessions, because visual information is distracting to the discussion of personal problems. While there is no denying that growing bandwidth will be offered to users in the future, the bandwidth available today works very well in many practical applications of telecommunications that would improve mobility. The larger issue in designing technology for human interaction is appropriate bandwidth, not more bandwidth.

Lack of a particular type of infrastructure is sometimes singled out by analysts and civic leaders a priori as a singular, key barrier to the deployment of more effective telecommunications applications. This is sometimes true, but not usually. The truth of this judgment in a particular circumstance depends on the nature of the applications, the state of readiness of users, the schedule under which the "missing" infrastructure is being installed as a result of market forces, the avail-

ability of alternative infrastructure either now or in the near future, the alternatives available in network attachments and associated software, and other factors including trends in functional interoperability. A case in point is the typical lack of fiber optic cabling to residential locations. Over the past decade, this "infrastructure gap" has been well mitigated by new technologies such as faster modems and new digital services that let the existing copper wiring system reach higher bandwidths, and by alternative infrastructures such as cable TV system retrofits and new small dish satellite antennas.

NETWORK ATTACHMENTS

Network attachments, sometimes called terminal devices or customer premises equipment are attached to telecommunications networks by users in order to send and receive communications. Examples of network attachments are telephones, fax machines, kiosks, pagers, and personal computers. Over time, more technically advanced network attachments can incrementally overcome some of the inadequacies in infrastructure.

NETWORK SERVICES

Telecommunications companies sell different kinds of telecommunications services to users. Examples of network services are local flat-rate telephone service, long distance toll service, centrex services (like call waiting and call forwarding), Integrated Services Digital Network (ISDN, a digital phone service that allows faster data transmission than through modems attached to typical analog phone lines), Asynchronous Transfer Mode (ATM, a very fast digital communications service just beginning to be used to connect organizations), voicemail, fax mailboxes, and video distribution. In some areas, cable TV companies are planning to sell Internet access service to consumers.

USER FUNCTIONS

User functions are activities that are carried out through the use of telecommunications. Examples of user functions are providing supervisory instructions to employees, watching the news,

interacting with peers, and searching for last weeks sports scores. There are seven generic categories of telecommunications user functions:

◆ Person-to-person real-time interactive com munications (pairwise or in groups), such as talking on the phone or participating in a video-conference.

◆ One way messaging from a person or organizational entity to one other person or to many people, such as sending an email or fax, leaving a voicemail, or a radio or television broadcast.

◆ Information retrieval through human interaction with a computer, such as searching and downloading from an online database.

◆ Transaction processing, such as buying or selling something with a credit card, or using an automatic teller machine to obtain cash.

◆ Remote process monitoring and controls, such as observing the status of freeway traffic via a map on the Internet, or checking the status of an arriving airline flight by calling an automated response system on the phone.

◆ Machine-to-machine communication (no-human intervention), such as managing traffic lights or electricity flows in a power system via networked computer-processing.

◆ Entertainment and recreation, which is mostly served now by one to many broadcasting, but will become more one to one and personalized.

TELECOMMUNICATIONS APPLICATIONS

A telecommunications application is the deployment and use by one or more organizations of networks, hardware, software, and telecommunications services to carry out an organizational purpose such as service delivery to customers, or support of employees in dispersed locations. Examples of telecommunications applications are telecommuting, telemarketing, community networking.

Telecommunications applications typically support combinations of user functions. For example,

a telecommuting application may support verbal interaction with the supervisor and colleagues, linking in to the company computer network, and obtaining information from outside the organization.

USER BEHAVIOR

People behave differently as a result of telecommunications applications than they did before telecommunications came along. Issues of human interest and motivation as well as education and skill levels come into play here.

Examples of user behavior in this context are how people actually use the telephone or the Internet. The predilection of people to use a video-conference as opposed to just talking on the phone, meeting face-to-face comes in here. How peoples' behavior with respect to local vehicle travel are affected by telecommunications is the bottom line focus in this report.

ORGANIZATIONAL BEHAVIOR

Like people, organizations change how they operate as a result of telecommunications. Examples include the effects of telecommuting on how companies do their work through employees, and how firms change their operating procedures as a result of electronic mail and the Internet.

Organizations generate travel by their employees, some of which is paid time over which organizations have a normal economic motivation to control costs. When organization pay for travel time, they have an incentive to develop telecommunications applications which will reduce costs or achieve more benefit for the same resources.

SOCIETAL FUNCTIONING

At the top level of the layering we consider how organizations and people behave collectively in the socio-economic system as a result of all the lower layers of telecommunications operating in the context of the marketplace and the political system. In other words, the effect of the marketplace and the political system cut across all the layers in this representation, but we are showing by this layer that there is a net result in overall socio-economic functioning. The particular aspect of socio-economic functioning of most interest in

this Plan is the mix of physical travel and communicating in the Southern California Region that results from expanding telecommunications and growing traffic congestion. There are also economic results such as job and enterprise creation, and job and enterprise destruction. The economic results will happen in any event.

Government or private action to improve one layer does not automatically cause a change in another layer. There are many intervening variables. For example, causing telephone companies to install fiber optics to schools and libraries does not mean that people will universally become more educated and earn more money, or that people will take advantage of the information that flows through the fiber optic cables, or even that the fiber optic cables will be attached to a source that provides useful information.

Similarly, reducing trips to schools and libraries may not be promoted by improving the quality of the telecommunications infrastructure and services and equipment that serve these schools, if the major obstacle to trip reduction lies in a different direction. In education, for example, there is a deep set of motivations and traditional practices that cause daily travel by students and teachers to school buildings and campuses. Wiring the building may reinforce these practices, not change them. Electronic services that could replace trips to a library may come from people using electronic connections to places other than libraries, such as the central database that catalogs library holdings, or an on-line information provider in a different city, or a mail-order book seller.

Another reason for focusing public interest based intervention into the telecommunications marketplace on applications rather than on the lower, more technological layers relates to the complexity and difficulty in even understanding how telecommunications technology is evolving. Random excerpts from the telecommunications trade press shown in **Exhibit 9** illustrate the technical complexity around telecommunications technology. As will be shown later in this report, applications can be more easily analyzed in terms of travel impacts than the technology components

of infrastructure, network attachments, and services.

Every different telecommunications application depends upon different institutional arrangements, systems of user training, methods of technical support, and levels of user acceptance. While these components can over time be generalized and addressed at the levels of user behavior, organizational behavior, or societal functioning, these components must initially be dealt with at the applications level. What is done in the way of institutional arrangements, training, and tech-

<table>
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Exhibit 9:
Trade Press Quotations Illustrating High Level of Obscure Jargon:

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"The ideal voice coder/decoder must meet the quantization distortion requirements of an international network connection. It must also support facsimile and modem transmission as well as take advantage of the latest in compression techniques to offer the highest level of bandwidth efficiency." from "Time for a shift in the public telephone network" by Martin Shum, Communications Week, January 22, 1996, page 39.

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"Fast Ethernet and 100VG-AnyLAN could be the platform upon which VLANs are initially built, although architectural differences from ATM would make VLAN implementation on those networks much more complicated." from "Switches threaten router's role" by Luc Hatlestad, InfoWorld, January 22, 1996, page 53.

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<tr><td>

"The transport services packetize data and send it over the network via a WinSock-compliant TCP/IP stack. This is done in real time via the IETF Real-Time Transport Protocol. The software also ensures the network path is clear of interference and that multimedia traffic gets priority over less deterministic traffic. Precept's Multimedia Services run atop the transport services to compress, decompress and synchronize the data." from "Multimedia traffic without the ATM fuss" by Barb Cole, Network World, January 22, 1996, page 65.

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</table>

nical support to gain user acceptance and wide-spread use of video-conferencing is likely to be different than what is done to implement electronic document retrieval, or medical image transmission.

Telecommunications Deployment

Telecommunications deployment for purposes of this report means increasing societal usage of voice, data, and video telecommunications. This deployment is related to the availability of hardware, software, and services from the private sector, and also the amount of such product that is actually bought. Deployment also bears a relationship to the way in which these products are used in households and in organizations.

There is a national, state, and local framework of legislation and regulation that shapes telecommunications deployment by making impacts on infrastructure and business practices. Consultants have reviewed policy-related materials from the California Public Utility Commission, Project California, the Governor's Council on Information Technology, the City of Los Angeles Special Advisory Committee on Technology Implementation, Joint Venture Silicon Valley, The Institute for Local Self Government (Sacramento), The National Information Infrastructure Advisory Council, the U.S. Department of Transportation, and the U.S. Department of Energy [4]. These reports and others contain a wealth of information on telecommunications deployment generally and in particular with respect to seeking overall economic effects. However, there is very little focus in these reports on the particular trip-making impacts of telecommunications, either positive or negative, except for references to telecommuting. When distance learning or telehealth is mentioned, the concern is on (as it should be) improving education or improving health care, as opposed to mobility impacts.

Outside of telecommuting applications and outside of the agencies and consultants that are already involved with the creation of this present plan, there is little focus on mobility impacts of telecommunications as a public benefit. The City of Los Angeles Information Technology Task Force

report does not mention the word "telecommuting." The Project California *Blueprint for Energizing California's Economic Recovery* advocates the establishment of a telecommuting management training program as its single mobility related initiative.

The California Public Utilities Commission report "Enhancing California's Competitive Strength: A Strategy for Telecommunications Infrastructure" lists reducing traffic congestion and improving air quality as a major benefit. The report describes how the Commission intends to foster a telecommunications infrastructure which forms the foundation on which "commuters see their traveling time shrink or vanish" and "rural and remote consumers, electronically linked to employers, schools, health-care providers, businesses, government agencies and sources of entertainment and information, no longer face the potential limitations brought on by distance from urban centers." That is the total of what the report says on mobility enhancement.

The general pattern in these and other telecommunications policy reports is to list travel savings as an assumed benefit of telecommunications, and then assume that any policy steps that will improve telecommunications will also yield travel savings. A partial exception to this pattern is the Institute for Local Self Government's 1991 *Telecommunications Framework for Cities* which generally links travel savings to local government development of specific telecommunications applications. As was documented in a U.S. Department of Energy study, *Beyond Telecommuting* [5], the obvious linkage of telecommunications to travel savings is only half the story. There are as many items on the list of ways in which telecommunications increases travel as there is on the list of ways in which telecommunications reduces travel. More on this point below.

Within the constellation of "telecommunications mobility" projects funded by the California Department of Transportation, there has been some interest in travel effects measurement, namely the work of University of California at Davis on telecenters and on the Davis Community Network, and the telecommunications planning work of the Chancellor's Office of the California

Community Colleges. On the other hand, there has also been a clear thrust in the Caltrans sponsoring office to divert focus from the travel substitution issue, and instead focus on larger, non-mobility issues, such as economic competitiveness and quality of life. Caltrans may be operating within its mission by focusing on telecommunications deployment broadly, but if the main task at hand for the Association and The Partnership is to achieve benefits related to the physical mobility that causes air pollution, then the focus must be on specific ways of doing that.

From among the layers described earlier, telecommunications applications are the best organizing focus for changing the path of telecommunications deployment toward the goal of achieving an applications level benefit, such as mobility enhancement. Applications are easy to understand, offer leverage points, facilitate widespread participation, and integrate well with business marketing initiatives.

Exhibit 10 shows the complex relationship between telecommunications applications and telecommunications technology in the form of infrastructure, devices, and services. Down the left side of the matrix are a variety of telecommunications applications that would accomplish trip-making impacts. These applications are logically

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Exhibit 10:
Linking Trip Purposes to Telecommunications Deployment

Travel Destination	Estimated Relative Share of Daily Trips	Telecom Applications for Trip Saving	Southern California Travel Saving Potential	Voice Phone Access to Computer Data	Voicemail	Mulipoint Audio Conferences	Home Computers Communications Equipped	World Wide Web of the Internet	BRI ISDN (Digetal Phone Service) to Homes	Desktop Switched Video	Megabit Bandwidth to Homes	Public Kiosks	Electronic Data Interchange (EDI)	Broadcast Video Monitoring of Public Spaces	Wireless Data
				Contributing Infrastructure, Devices and Services											
Place of daily work	High	Telecomnuting	6.3% of Commute Trips		X	X	X		X	X	X				
Shopping Malls	High	Check stockouts, parking, & crowds before you go. Once there, use kiosks to avoid other stops.	TBD	X			X	X	X		X	X	X	X	
Off-site Work Meetings	Medium	All modes of teleconferencing	TBD			X		X		X	X				
College Campuses & High Schools	Medium	Networked electronic classrooms. Remote access to library resources	TBD	X		X		X	X	X	X	X			
Medical Offices	Medium	Remote consultation. In-home patient monitoring. Remote treatment.	TBD		X		X	X	X	X	X				X
Customers & Prospects in the Field (Industrial & Business Sales)	Low	Pre-visit remote monitoring & qualification. Electronic interaction for followup. Sales literature on line.	TBD		X		X	X	X	X					X
Grocery Stores	Low	Electronic ordering & home delivery	TBD				X	X	X		X		X		
Cinemas, Video Rentals, Arcades	Low	Enticing, in home alternatives to going out.	TBD				X	X	X	X	X			X	
Government Buildings	Low	Remote access to documents, services, hearings.	TBD			X	X	X	X	X			X	X	
Banks, Financial Services	Low	Teller machines in malls. Ekectronic deposit & bill pay. Loans by phone.	TBD	X			X	X	X	X		X	X		
Prospective Employers Job Hunt Stops	Low	Electronic access to current opportunities Video screening interviews.	TBD	X	X		X	X	X	X		X			
Houses for Sale with Listing Agents	Low	On-line photos for screening. Electronic signatures.	TBD	X	X	X	X	X	X	X	X		X		X

and necessarily divided by trip purpose, such as journey to work and shopping. Examples of particular telecommunications infrastructure, devices, and services that can underlie the potential applications are indicated by the matrix on the right hand side of the exhibit.

DEPLOYMENT

In general, telecommunications applications are implemented one at a time through what we call telecommunications application development and deployment (TADD) projects carried out by organi-

zations. For example, an employer implements telecommuting, an on-line service provider works with a group of stores to set up electronic shopping, or a university sets up a distance learning system that lets students take classes from their homes and offices. A more complete listing of telecommunications applications than can fit in one column of a matrix is shown in **Exhibit 11.**

Exhibit 11:
Generic telecommunications applications with travel impacts, categorized by applications area or travel purpose

◆ **Telework (changing the location of workers)**

• Telecommuting from home

• Telecommuting from telework centers

• Telework facilities exchange

• Virtual office practices for sales, maintenance, and other mobile professionals

• Audio or video teleconference business meet ings within large multi-site organizations

• Audio or video teleconference business meetings between different organizations

• On-line design collaboration between networked studios using graphic workstations

• Inter-institutional networks for research and education collaboration

• Telemetry monitoring of remote instrumentation traditionally visited (air quality, water levels of streams)

• Initial employment interviews conducted via videoconference

• Remote monitoring, diagnosis, and even repair of complex machinery such as computers, photocopy machines, and automatic elevators

• Replacing a staff of employees (who all commute to a facility) with computers and other machines (elimination of telephone operator jobs, for example\; elimination of customer assistance staff with an interactive voicemail system)

• Remote translation services over the telephone

◆ **Information retrieval**

• Typical community networks such as Los Angeles and Orange County Free-Nets

• Typical home access to commercial on-line services like Compuserve, America On Line, Prodigy, and GENIE.

• Typical home Internet usage

• On-line library catalogs

• Real estate multiple listing databases with interior and exterior photos

• Electronic resume distribution and job postings

• Remote interactive access to career information

• On-line telephone directories like the French Minitel

• Fax-on-demand services for product information, real estate listings, etc.

• Remote access to citations, abstracts, and full-text on-line literature, eg, Dialog and LEXIS/NEXIS

◆ **Electronic entertainment**

• On-line wagering

• 500 channel cable TV in homes providing more coverage of events that people might otherwise attend in person (pet shows and fashion shows at the mall)

• On-line, interactive chat services

- Movies on demand delivered via cable or satellite dish

◆ **Distance learning**

- Videoconferencing between college classrooms
- On-line educational courses through student's computer
- University registration by phone or computer
- Adult education/training provided via one-way television
- Adult education/training provided via interactive videoconference
- Adult education/training provided via interactive computer-aided instruction in a kiosk
- Homework help lines
- On-line educational services and communications offered through bulletin boards, commercial on-line services, and the Internet.

◆ **Telehealth**

- Electronic medical records
- Remote consultation techniques between medical facilities\; includes teledentistry
- Remote diagnosis between medical facilities
- Remote participation in medical procedures, eg teledentistry and telesurgery
- Home monitoring of medical patients
- Electronic communications in support of home medical treatment
- Medical image transmission
- Teleconference meetings for support groups
- Remote access to psychological and other counseling
- Claims forms filed electronically
- Email and telephone for medical follow up.
- Automatic telephone calls to remind people to take medication
- Remote access to medical literature

◆ **Traveler information services**

- Airline ticketing by telephone
- Electronic "ticketless" ticketing

- Travel information received over the telephone or via personal computer
- Bus pass sales through bank ATM kiosks

◆ **Public safety applications**

- Videoconference arraignment of arrested crime suspects
- Interactive court services: electronic document filing, searching, and retrieval
- Electronic monitoring of home confinement
- Legal proceedings conducted by telephone audioconference
- Crime reports taken over the phone instead of in person
- Criminal justice information systems within the law enforcement and judicial community

◆ **Electronic government**

- Electronic benefits distribution
- Televising of government meetings and hearings
- Electronic filing of taxes, claims, and other forms
- On-line access to government documents through home computers
- On-line access to government documents through kiosks
- Government documents via fax-on-demand systems
- Licensing and permit transactions through kiosks and the internet, including obtaining permits and accessing information on regulations.
- Electronic voting

◆ **Teleshopping**

- On-line grocery shopping
- On-line gift shopping
- On-line automobile shopping
- On-line clothing shopping
- On-line shopping for consumer electronics and home appliances
- Telephone ordering of pizzas and other food for delivery

- Telephone and on-line ordering of tickets for events and for travel

◆ **On-line financial services**

- Cash machine ATMs in non-bank locations

- Electronic home banking

- Loan applications taken via videoconference kiosks

- On-line investment services for managing port-folios and making transactions in stocks, bonds, and mutual funds

- Direct bank deposit of employee paychecks

◆ **Telelogistics**

- Documents that are faxed or sent as computer files instead of ink on paper

- Personal or business correspondence by email or fax rather than by U.S. Postal service, overnight delivery, or local courier.

- Movement of digitized film clips between production locations

- In metro use of overnight package deliver like Federal Express

- Postage stamp sales through bank ATM kiosks

- Electronic data interchange (EDI) for commer-cial transactions between companies and gov-ernment agencies

- Electronic distribution of software

- Electronic versions of newspapers and maga-zines

- Move page images from layout facilities to printing press locations electronically

2. Status of Telecommunications in Southern California

In the six county Southern California Region there are as of early 1996 thousands of telecommunications applications development and deployment projects in various stages ranging from conceptual discussion to economic justification analysis to work planning to implementation to testing to initial operation. Successful projects when completed turn into applications that can be studied for lessons helpful to others.

Because of the pervasiveness and changing nature of telecommunications, an assessment of the status of telecommunications in Southern California is necessarily based on sampling. It is easy to find many examples of fine telecommunications applications across the six counties of Southern California, a few of which are shown in **Exhibit 12**.

Another measure of the initiative that is being shown in Southern California telecommunications development lies in the 56 regional non-profits and government agencies that applied for funding under the U.S. Government's Telecommunications and Information Infrastructure Assistance Program (TIIAP) in 1995. See **Exhibit 13**. These are projects that the exemplify public interest goals of the Clinton-Gore National Information Infrastructure (Superhighway) program. There were 1800 applicants nationwide and 117 winners nationwide. Five of the winners were from the region, described in **Exhibit 14**. As usual, the goal of mobility improvement does not seem to be explicit in any of these projects. It should be added to the design through the influence of the Telecommunications Cluster.

Exhibit 12: **Examples of Existing Telecommunications Applications in Southern California**	
Imperial Co.	• LightLink Internet Access Server in El Centro. Provides Internet access to information from City of El Centro, public schools in that county, Imperial Valley Community College, and Imperial County businesses.
Los Angeles Co.	• A 1995 NII Awards Finalist, Kaleidospace is an application on the World Wide Web of the Internet that provides independent artists, musicians, and writers with a new outlet for promotion, distribution, and placement.
	• The Blue Line Televillage being set up by the Los Angeles County Metropolitan Transportation Authority at the Compton Transit Center is a community center where computers and telecommunications provide South Central Los Angeles residents with education and training, medical information and services, telework support, and access to government information and transaction processing.
	• CityTel network serving the City of Long Beach is the nation's first citywide ISDN telecommunications network. CityTel network links 21 departments at 200 locations with 4,500 employees. It offers both voice and data communications.
	• JobTrak Corporation of Los Angeles operates one of the largest online job recruitment services, used by more than 150,000 small and large employers to list openings for 300 college career centers nationwide.
	• Another 1995 NII Awards Finalist, the Santa Monica Public Electronic Network provides electronic mail, online conferencing, and public access to government information to all citizens, particularly those economically disadvantaged who would otherwise be excluded from participation in community life.
	• Ameritech will soon provide Los Angeles County Superior Court with interactive court services, enabling law firms to file and retrieve documents electronically, as well as search documents and civil indexes.
Orange Co.	• A 1995 NII Awards Finalist, the Internet Payment System created by First Virtual Holdings, Inc. of Huntington Beach provides a safe, easy, economical means for buying and selling information and goods over the Internet.
	• California Community Colleges have been offering televised courses over public television broadcasting stations and local cable channels since the 1970s.
	• The Irvine Unified School District is a pioneer in the use of interactive cable television for teaching classes of children who are distributed over many separate school buildings.

Riverside Co.	• CORNET, County of Riverside Internetwork, is an Internet-based electronic communications network that provides interagency t communications and information exchange among local governments and educational institutions.
	• The Consolidated and Coordinated Courts of Riverside County has established a cross-court document imaging system to allow document filings for any court to be made in any court facili ty countywide. A person who receives a traffic violation on one side of the county can pay in their hometown courthouse on the other side.
San Bernardino Co.	• A graduate-level, mentored on-line seminar has begun to be offered at the International School of Theology in San Bernardino via electronic mail. It demonstrates an alternative learning environment to the simulated lecture model of videoconferencing and the correspondence course model used in televised courses.
	• Video arraignment of charged criminal defendants has been used in the County of San Bernardino, as well as Riverside and Los Angeles Counties, since the 1980s. An interactive video signal links the jail and the courthouse, instead of having to transport prisoners to the judge.
Ventura Co.	• California State University Northridge has a distance learning program offered via video telecommunications at its satellite campus in Ventura and at the Antelope Valley Telecenter.
	• The City of Oxnard Police Department has provided each officer with immediate access to a gang offender tracking system, a database of information on Oxnard's 50 gangs. Also, an auto mated phone calling system warns neighborhood residents of crime patterns that they can defend themselves against.
Region-wide	• Banks such as First Interstate are deploying Automatic Teller Machines in an increasing number of locations in Southern California.
	• The InFoPeople Project provides public access to the Internet through Public Libraries through out California, including the six counties of the Southland.
	• The Association of Governments ACCESS project is in development to provide access to maps and the Internet in local government offices throughout Southern California. (See Appendix B for a detailed description.)

Exhibit 13:
Non-profit and government organizations in the Southern California region that applied for federal funding support of telecommunications development in 1995.

- City of Anaheim Public Utilities Department
- City of Burbank
- California State University-Dominguez Hills, School of Extended Education
- Tomas Rivera Center, Claremont
- Coast Community College District
- Los Angeles County Office of Education, Educational Telecommunications Network (ETN)
- County of Imperial
- Information and Referral Federation of Los Angeles
- LA Free-Net
- Hueneme School District
- California State University-Fullerton
- City of Glendale, Library Division/LNX Systems
- Irvine Unified School District
- Desert Community College District, Copper Mountain Campus
- California State University-Long Beach
- American Film Institute, Advanced Technology Programs
- C.O.A.C.H. Foundation, Los Angeles
- Center for Governmental Studies, Los Angeles
- CHARO Community Development Corporation, Enterprise Innovation Center, Los Angeles
- City of Los Angeles, Eighth Council District
- Community Coalition for Substance Abuse Prevention & Treatment, Los Angeles
- Crippled Children's Society of Southern California, Inc.
- Hobart Boulevard Elementary School, Los Angeles
- Korean Youth and Community Center, Los Angeles
- L.A. SHARES
- Los Angeles County Metropolitan Transportation Authority
- Los Angeles County Public Defender

Los Angeles Educational Partnership

Los Angeles Public Library

- Los Angeles Unified School District
- National Health Foundation, Los Angeles
- Otis College of Art and Design
- Public Counsel, Los Angeles
- UCLA Obstetrics & Gynecology Women's Health Division
- UCLA Institute of Archaeology
- USC School of Urban and Regional Planning
- USC School of Engineering
- Monrovia Unified School District
- Strathern Elementary School, North Hollywood
- Sponsorlink, Northridge
- Oxnard School District
- Oxnard Union High School District
- City of Palmdale, Public Safety Office
- Palmdale School District
- Pasadena City College
- California State Polytechnic University-Pomona
- Hueneme School District
- Redondo Beach Unified School District, ADTECH Consortium
- ECT Technolink Foundation, Inc., Riverside
- San Bernadino County Superintendent of Schools
- Hermandad Mexicana Nacional Legal Center, Santa Ana
- Orange County Environmental Management Agency
- Santa Ana Unified School District
- Los Angeles Mission College
- El Camino Community College
- San Gabriel Valley Commerce and Cities Consortium

Exhibit 14:
The five Southern California winners in the 1995 grant competition from the U.S. Department of Commerce, National Telecommunications and Information Administration Telecommunications Information Infrastructure Assistance Program.

Los Angeles County Office of Education Educational Telecommunications Network (ETN)	The Los Angeles County Office of Education will carry out a comprehensive telecommunications planning process for 82 K-12 school districts and 1.4 million K-12 students, 65% Hispanic and African-Americans. The outcome of this process will be a replicable planning model for schools to use in customizing their infrastructure design. As a result, schools will be able to plan for affordable access to applications such as reduced cost digital telephone service, Internet connectivity, and district local area access to County applications such as payroll and social service information. The project partners are the Los Angeles County Office of Education, 82 K-12 school districts, five P.T.A. districts within Los Angeles County, and the Los Angeles County Public Library.
Los Angeles Unified School District	This project will use grant funds to provide free Internet services and computer access to Los Angeles public school students and their families -- the majority of whom are minority, non-English speaking, and of mid- to low-socioeconomic status. This project will establish an Internet link with local, state and national museums and the city library, providing a free, inter-active exchange of information among students, teachers and parents in central community facilities. The community partners for this project include the Afro-American Museum, the Gene Autry Western Museum, the Japanese American National Museum, the Museum of Science and Industry, and the Central City Library.
Hermandad Mexicana Nacional Legal Center Department of Information Services, Santa Ana	The Hermandad Mexicana Nacional will create a mobile interactive job placement process by developing a Mobile Job Bank to circulate in underserved Hispanic communities. Common community characteristics include substantial unemployment and underemployment, lack of access to job information resources, and communication obstacles. The mobile on-line service will provide job placement, training and counseling in partnership with existing municipal, county, state and private employment databases. The caravan will be a mobile kiosk utilizing multicultural icons on touch-screens to let applicants access updated employment opportunities, match skills to available jobs, and set up real-time job placement interviews.
Santa Ana Unified School District Support Services Division	The Santa Ana Unified School District will demonstrate how to use an existing cable television network to bring the resources of the Internet to over 50,000 low-income, limited English-speaking K-12 students. The district has a broadband network of coaxial cables called the INET, or Institutional Network. With the addition of computer technology, this network will connect information servers at 52 school sites, including all existing computer labs in each school, Rancho Santiago Community College, and numerous community agencies at City Hall. The District Technology Task Force, which includes the school district and the city government, also has numerous private sector contributors, such as Comcast, Cross Country Wireless, Apple Computers, and Featherstone Communications.
Information and Referral Federation of Los Angeles County	The INFO-LINE of Los Angeles will use grant funds to improve delivery and access to public welfare services. INFO-LINE regularly serves more than 200,000 individuals and families each year, but demands exceed twice that. Los Angeles County has more than 4,500 health and human services programs with hundreds of overlapping and conflicting geographically-based service areas. INFO-LINE will provide widespread, low-cost, high-speed access to a comprehensive, centralized and standardized database. The database will improve the capacity of local government and private non-profit organizations to serve the county at large and help individuals gain more information about the services available to them. To accomplish project goals, INFO-LINE will use Internet-based access and will be accessible from even the most basic of computers already in use at various health and human services organizations.

3. Trip Making Impacts of Telecommunications

Information received from a distance via telecommunications can affect trip-making in several ways: First and foremost, it can cause trips to be eliminated, substituted and or fulfilled, which will be covered in more detail below. But telecommunications can have other effects on trip making as well:

It can change the length of trips, making them either longer or shorter. An on-line information system could be designed to describe the nearest place to purchase a needed item, rather than driving to a familiar place that is farther away. In the longer term, telecommunications has been implicated as a cause in residential sprawl, because people can use telecommunications to let them telecommute or operate a home-based business, and thus eliminate daily commuting to a central office during peak traffic periods. The weekly trip to the supermarket, however, could be a much longer trip for a person living in a rural region surrounding a metropolis.

Telecommunications can also cause trips to be made at different times, perhaps avoiding peak periods. Telecommuters and other home workers with flexible schedules have more opportunity to do some necessary errands during off-peak periods, and stay put at home during the morning and evening rush. On the other hand, just-in-time delivery services like Federal Express, which are very much enabled by the technology and habits of the information age, generate vehicle traffic in evening rush hour in order to meet the deadlines that are part of their rapid service.

Telecommunications can furthermore cause the route of a trip to change. Good information about traffic conditions generated by Advanced Traveler Information Systems can be the motivation for staying off of a crowded corridor in peak, or driving into a crowded corridor that would typically be avoided in the absence of an information system that can now reveal that the traffic is free-flowing.

Finally, telecommunications can cause the mode of travel to change. An information system that provides accurate, real-time information on the exact time when a bus will arrive at a nearby bus stop, or a system that enables buses to make front door pickups, could cause more people to ride the bus rather than use their private automobiles.

The net effect of all of these changes that growing telecommunications can bring to metropolitan area travel patterns is very complex to understand, but there is no reason to assume that the overall effect is a net reduction in trip making. It is reasonable to assume that the price of travel in dollars and in time is also an influence on the balance between telecommunications and traveling that people and a society collectively reach. When telecommuting and telephone use surged in the days and weeks following the Northridge earthquake and the disruption of Southern California highways, the pattern was an example of what happens when travel becomes more costly relative to telecommunicating. As the roads are repaired and traffic delays return to normal, telecommuting and calling falls back some, because traveling has in effect become less expensive in time and money.

Looking at trip replacement now, telecommunications eliminates trips in the following ways:

The main method of trip elimination is that telecommunications lets people achieve enough of the functionality of going to a place without actually having to go there. Sufficient functionality is achieved from a distance by telecommunications allowing observation, transactions, communications, and information exchange. The use of telecommunications as a substitute for travel is called telesubstitution. Instead of driving to work, a worker stays home and telecommutes. Instead of registering for university classes on the campus, a student registers over the telephone.

An implication of telesubstitution is that telecommunications applications offer alternatives to accessibility for those who can use telesubstitution, and improvements in accessibility for the remainder of people who still need or want to travel.

Accessibility is defined in the 1994 RME as the ability or ease of all people to travel among various origins and destinations. Alternatives to accessibility means that some of the purposes of

travel become available through remote, electronic, telecommunications access in addition to physical access. This strategy recognizes that access to a service through telecommunications is likely to provide a quite different human experience than access by visiting a person or place, sometimes superior and sometimes inferior. There is a difference between being there and calling there. At the same time, telecommunications access alternatives can be designed to be functionally satisfactory in many service delivery and communications situations, especially where physical travel is difficult or impossible.

At the same time that alternatives to accessibility are being used, improved accessibility is a possibility for those who still need to travel. Improved accessibility means that physical transportation in vehicles is improved because fewer vehicles are on the road and there is less congestion in peak periods. To the degree that the use of alternative accessibility takes vehicles off the road in peak periods, there will be accessibility improvements for those who do not have satisfactory telecommunications alternatives. How many net vehicles telecommunications usage removes from the road must take into account both telecommunications substitution effects and latent transportation demand. Latent demand refers to the phenomenon of empty road space being filled by other vehicles and drivers taking advantage of the space left by vehicles that are removed.

Expanding alternatives to accessibility, and improving accessibility are together defined as mobility enhancements.

In addition to providing opportunities for telesubstitution, telecommunications also lets people call ahead to find out that it is not worth making a trip to get there. Instead of driving around to a variety of stores looking for a particular item to purchase, a shopper phones to a number of stores until the item is located, and then drives to one store directly. This effect is closely related to telecommunications changing the length of trips.

Accurate, up-to-date knowledge of conditions at the destination or on the journey can cause trips to be canceled as unnecessary with perhaps teleconferencing or other telesubstitution used instead of face-to-face presence. Joining the

meeting by telephone is not so bad if the only freeway leading to the site of the meeting is blocked by an accident. This effect is closely related to the effect of telecommunication changing the timing or route of a trip, as discussed above.

Going beyond decision making by individuals, telecommunications allows the revision of organizational operations to eliminate passenger and freight trips that raise costs unnecessarily. Instead of a soft drink delivery truck driving to a heavily used Coke machine once every two days to fill it up (whether needed or not), wireless radio status reporting on the contents of the machine allow the bottler to visit as needed, which results in visits that calculate out to one visit every 3.3 days.

Going beyond direct functional substitution, a fourth source of travel saving comes from telecommunications providing opportunities to change leisure, recreational, and personal activity toward patterns that generate fewer trips. An example here is members of a household staying home to surf the Internet rather than going out to see a movie at the cinema. Instead of going to church on Sunday, a family stays home and watches a popular minister on a televised religious service.

Another way of looking at trip making impacts is to consider three kinds of effects, telework, teleservice, and telelogistics.

1. Telework is a use of telecommunications that changes the location of workers. Telecommuting is the most familiar form of telework, and the leading example of trip substitution. Telecommuting means working at home or closer to home, instead of commuting to the usual office. Extensive efforts are underway by the Southern California Telecommuting Partnership and the Southern California Association of Governments to raise the awareness and use of telecommuting. Growth in telecommuting has already been factored into the Regional Transportation Plan prepared by the Association of Governments. Other areas of trip substitution through telecommunications have not been.

The most common form of telework, though frequently unrecognized, is the movement of jobs

from central cities to suburbs. The dispersal of jobs into 24 Edge Cities[6] scattered around the Southern California region is only possible because of telecommunications.

Changing worker locations may or may not be the primary purpose of a telecommunications application that happens to change workers' locations. As the WorkSmart study, developed for Caltrans, by the Center for the New West reports [7], telework is motivated by the goals of organizations for mission performance as well as to meet the expectations of the work force. For example, better customer service and higher sales productivity may be motivating corporate efforts to push outside sales professionals into mobile, virtual office arrangements where these workers stop commuting to the company office each morning and instead drive directly to customer locations. Furthermore, a change in worker location because of telework may or may not be favorable to trip reduction efforts. It depends on how much the worker moves around across the total sum of commuting plus work-related trips.

2. Teleservice is a use of telecommunications that modifies the traditional location of customers receiving service. A bank automatic teller machine is a prime example of teleservice. As in telework, mobility impacts are not always a consideration in the design of teleservices by organizations.

3. Telelogistics is a use of telecommunications that reduces trips that move goods. A fax-on-demand system that provides product information to consumers and replaces some mailed material is an example of telelogistics; another example is mail order shopping.
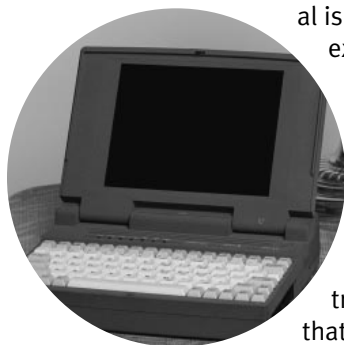
The key notion in using telecommunications to reduce trip making is not the impossible and ridiculous task of stopping all the important and necessary travel that people do, but to provide opportunities to eliminate trips that people would rather not make, that organizations would rather not pay for, or that have pleasant alternatives to yield the same or even more functionality.

If telecommunications are growing rapidly and can eliminate and/or substitute trips, then why is trip-making showing so much growth as well?

There are several reasons:

◆ Applications of telecommunications technology by people and organizations always lag behind the potential power of the technology. New ways of doing things used by some generally take many years before being used by most.

◆ The financial resources of organizations and people are not always available to buy telecommunications products and services, and to organize their use into applications that solve problems.

◆ Many people simply do not have the awareness, knowledge, skill, or motivation to use telecommunications for the purpose of making or substituting trips.

◆ Apart from forward thinking policy leaders in organizations such as California Department of Transportation, the Southern California Association of Governments, the Southern California Economic Partnership, the South Coast Air Quality Management District, and the Southern California Telecommuting Partnership, most people in the region, including the majority of government and business leaders, are not planning telecommunications applications with mobility impacts as an explicit goal. Instead, telecommunications applications are implemented to enhance sales, improve customer service, cut costs, or increase productivity, all worthwhile goals, but not necessarily mobility-enhancing.

Perhaps the most serious threat to mobility enhancement from expanding telecommunications is the fact that it is a generator of trips as well as a means of reduction. Telecommunications does this through a number of dynamics:

◆ Telecommunications provides additional knowledge of opportunities that are available only by taking trips.

◆ Telecommunications expands the geographic scope of awareness and operations, as well as the number of contacts, and creates follow-up activity that requires travel.

◆ Telecommunications improves income, productivity, and wealth, some of which is used to take trips.

◆ Telecommunications facilitates geographic location changes, especially dispersion patterns such as suburbanization of residences and employment, which creates some additional travel demands.

◆ Telecommunications provides support to travelers, such as remote home security, and continuous contact with colleagues and loved ones.

◆ Telecommunications improves the performance of the transportation system through traveler information, traffic control services, and other forms of Intelligent Transportation Systems (ITS).

These issues are discussed in much more detail in the U.S. Department of Energy report, Beyond Telecommuting. Any strategy that accelerates telecommunications as a means of enhancing mobility must be designed to avoid the effects of telecommunications that are counterproductive to mobility.

4. Issues Summary

The main impetus for the Partnership is mobile source emissions that come from vehicle traffic. The Telecommunications Cluster's assigned way of reducing those emissions is to take steps to accelerate the deployment of telecommunications so as to provide popular alternatives to local driving.

A major issue is the determination of how the Telecommunications Cluster can make the inter-actions, transactions, and relationships that cause travel in Southern California more telecom-munications intensive and less transportation intensive. Since resources for intervention are limited, the Cluster needs to identify and focus in on critical leverage points.

Telecommunications is a vast and changing domain, and the issue in achieving a narrow pur-pose like trip reduction is to define the actions that are most likely to make the purpose be achieved. The secondary Cluster goal of regional economic benefit is likely to be achieved no matter what aspect of telecommunications is promoted.

Civic leaders can stay above the turmoil of ongo-ing changes in technology and in industry partici-pants by focusing on the development and deployment of applications. But which trip types and which applications of telecommunications should the Cluster focus on? Obviously, those which involve the most travel, and those which contain a potential for reducing travel would be the most attractive target.

Trip reduction is often not a major criterion addressed by those people responsible for appli-cations development. However, trip reduction may be a byproduct of pursuing other benefits, such as cost reduction or providing convenience for customers. This logic suggests that the Cluster should focus on applications where stakeholders can realize other major benefits in addition to travel savings.

After the identification and analysis of critical telecommunications applications, the next issue is how to make these applications happen sooner, better, and more widely. This requires analyzing applications for barriers to deployment, and determining what to do about those barriers. An issue here is identifying barriers that lie on the critical path to solution, where intervention by the Telecommunications Cluster is truly useful.

5. A Strategy for the Southern California Region

Mission, Goals, and Objectives of the Strategy

MISSION STATEMENT

To accelerate the deployment of telecommunications, with an emphasis on improvement of mobility and access.

GOALS

The overall goal is to achieve an improvement in the present pattern of telecommunications deployment that result in a dramatic change in travel behavior in the region over the next 25 years.

1. Expand the market share of information exchange, transactions, interactions, and relationships that are fulfilled through telecommunications access instead of by vehicle

2. Reduce the barriers to -- and create new incentives for achieving -- the full market potential of telecommunications for mobility and access improvement.

3. Assist local government and organizations to design and implement applications that expand electronic access to services and work locations.

4. Assist organizations to design and implement applications that reduce vehicle trips in logistics systems.

5. Create an integrated, detailed understanding of how the quality and distribution of telecommunications infrastructure impacts air quality and the regional economy.

OBJECTIVES OF THE TELECOMMUNICATIONS DEPLOYMENT STRATEGY

The objective is a significant program of telecommunications deployment acceleration through the year 2020. The strategy continues the objective in the 1994 RTP of 10.4% for home to work trips in 2015 for telecommuting and working at home. In addition, the strategy aims to attain a higher reduction in daily person trips from all other telecommunications applications, based on policies, and actions that go beyond the 1994 plan. (The new numerical objective is evolving through the analysis of alternatives developed for the 1997 RTP).

1. Document mobility and access improvements from teleservice, telework, and telelogistics, as well as resulting emission reduction and energy conservation results.

2. Identify barriers to telecommunications deployment, and action(s) to eliminate or ameliorate.

3. Establish disaster preparation, travel saving telework and teleservice procedures that are well exercised routinely in normal conditions and which are immediately available to keep organizations operating in the aftermath of earthquakes, storms, and other transportation disturbances.

4. Assist transportation planners to begin using a telecommunications activity time series and forecast process that is comparable to the trip volume time series used by regional transportation planners.

6. Strategy Assumptions

The Telecommunications Deployment Strategy described in this document was formulated under a number of assumptions:

1. Telecommunications deployment is already occurring in Southern California, driven by organizations of all types seeking revenue enhancement, cost reduction, productivity improvement, or customer service gains through using telecommunications infrastructure, network attachments, and services that are offered by a dynamic and growing telecommunications sector.

2. As a result of organizations and individuals pursuing benefits in their own interest, telecommunications deployment can yield enhanced economic development, an improved quality of life, and other public benefits.

3. Mobility enhancement (improved accessibility and alternative accessibility) can be an important public benefit of telecommunications deployment.

4. But, mobility enhancement is usually not a sought goal in market-driven telecommunications deployment. Mobility enhancement is usually no more than a side effect, or incidental consequence. Other organizational and personal goals are usually the drivers, such as service improvements, lower costs, increased competitiveness, and greater worker productivity. This assumption is in line with the thrust of Caltrans' WorkSmart project, which finds business goals to be the main motivation for telework practices, and treats transportation impacts as consequences [8].

5. Even with those telecommunications applications that have not had mobility impacts considered in their design, positive or negative trip generation impacts are a frequent result. Thus any telecommunications application can be assessed for mobility impacts. The Telecommunications Deployment Strategy planned here can find unintended, unplanned mobility benefits in telecommunications applications, and seek ways to expand those kinds of applications. At the same time, the process described here seeks to avoid emphasizing telecommunications applications that tend to increase vehicle mobility demands, even those these applications may have other positive individual or organizational benefits.

6. The Southern California regional public interest lies in changing the presently ongoing path of

telecommunications deployment to increase the focus on mobility enhancement. In order to save travel, telecommunications must be focused on those particular applications, such as telecommuting and certain kinds of teleservice, that actually replace trips, **Exhibit 15.**

Exhibit 15:
Sharp Focus Needed for Travel Savings from Telecommunications

Travel-saving apps

Telecom Applications

Telecom Technology
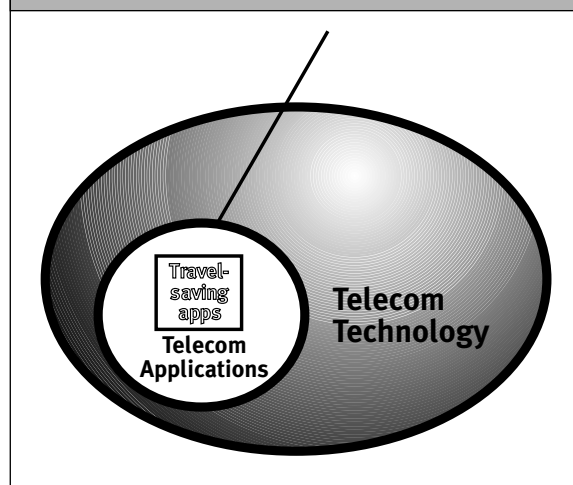
7. Shared understanding by civic leadership and the general public of how the present path of telecommunications deployment is influencing access and mobility is generally lacking. For example, the words "telecommuting" and "telecommunications" are frequently confused. Beyond the officials in the organizations that have been involved in the development of this strategy, public policy leadership understanding is not now at a level sufficient to take wise action. An understanding of which parts of telecommunications need to be emphasized in order to achieve mobility benefits is a necessary first step in the strategy described here.

8. This strategy is targeted to an audience of people who are willing to deepen their understanding of the issue of telecom-travel interaction, and who are in a position to take action by initiating or supporting applications development/deployment projects. This audience would be those directly involved in telecommunications application development from any perspective, including professionals at all levels working in the information services (IS) functions of organizations, managers in client divisions and departments that are

serviced IS, higher-level managers and board members who make decisions regarding telecommunications deployment projects, consultants to such projects, and vendor-suppliers in all related telecommunications hardware, software, and services. Also, public sector officials who are in a position to remove or ameliorate identified roadblocks to such projects are to be engaged in implementing the strategy. The Strategy attempts to influence their thinking to include consideration of regional mobility effects.

9. Regional strategic action(s) can be designed to work broadly across many kinds of telecommunications technologies, users and trip purposes. While the wireless communications industry is associated with the support of physical mobility, there may be particular applications of wireless communications that tend to save on travel; these can be found and emphasized as part of the present strategy.

10. A regional strategic marketing process for telecommunications deployment acceleration can be implemented within the existing organizational structure for the Southern California Economic Partnership and the Telecommunications Cluster. There is no need for new organizational forms.

11. The Telecommunications Deployment Strategy (TDS) is designed to be effective at any level of resources, even a low level of resources, or a level that fluctuates. In addition, the strategy is to be upwardly scaleable to a relatively high level of resources, should leadership choose to emphasize telecommunications deployment in the years ahead.

The TDS influences and amplifies private sector telecommunications applications development and deployment activity. It supports the Association of Governments and the Economic Partnership professional staff working in an expandable broker role between organizations that can contribute part of a solution to Southern California traffic.

12. The TDS is to be designed to be effective even in the state of telecommunications industry uncertainty and likely turbulence that will be brought on by the impact of the recently enacted Federal Telecommunications Act of 1996.

The present Strategy's focus on telecommunications applications that meet the needs of user organizations is one way of remaining effective; these are likely to change more slowly than telecommunications industry products, services, and competition.

The strategy described here is based on a professional staff process of screening through existing telecommunications applications to find those with the strongest mobility enhancement effects. These applications would be analyzed and grouped to find common issues that the Telecommunications Cluster could address through the elimination of barriers and the initiation of marketing programs.

Alternatives considered

The Strategy presented here was chosen to be implemented ahead of other alternative approaches that have been discussed by regional and state policy leadership and that flow from different assumptions. These alternatives -- each of which may emerge later as appropriate for implementation by the Telecommunications Cluster as a result of analysis and discussion of the barriers to existing travel-saving applications -- include:

1. Creating comprehensive inventories of telecommunications products, telecommunications services, or telecommunications infrastructure in Southern California. Such inventories can be difficult and expensive to create, and they have a short period of usefulness. They should be conducted only when needed to solve a critical problem or illuminate a priority issue related to the advancement of mobility-enhancing telecommunications applications. As an example, an inventory of available modems in Southern California is important if the creation of such an inventory is pertinent to expanding the deployment of a class of telecommunications application that is important to telecommuting, teleshopping, or some other mobility enhancement that is selected for emphasis by the Telecommunications Cluster. Similarly, the work of compiling an inventory of fiberoptic or coaxial cable connections to Southern California residential premises should be delayed until the Telecommunications Cluster staff and Advisory Group determine that having such an inventory is directly pertinent to promot-

ing the deployment of mobility-improving telecommunications applications.

2. Immediately selecting particular telecommunications hardware items for inclusion in a consumer marketing plan. The selection of particular hardware for marketing emphasis by a government-sponsored partnership is premature until targeting judgments are made that focus on the telecommunications applications with the highest mobility impacts. Consumers and users make their choices in a market environment that is too complex for attempting a private-public partnership's consultant or committee choice of winners.

3. Immediately selecting particular network infrastructure components -- such as fiber optics, community networks, or telecenters -- for marketing and technical assistance efforts. Judgments on which infrastructure components are blocking the most important mobility-enhancing applications are premature until the most important mobility-enhancing applications are actually determined.

4. Immediately selecting particular user industries and associated applications (such as tele-health or distance learning) for focused technical and policy assistance. Instead, the recommended approach is to match applications with trip purposes that people would rather avoid, or that organizations find excessively costly, and let the applications and industries to be focused upon emerge from this process.

5. Establishing a broadly focused brokering function along the lines of Smart Valley in the San Francisco Bay area, the San Diego Cities of the Future program, or the Davis Community Network. These other groups pursue a variety of important community objectives through the connection of technology providers, service providers, applications developers, and end users. The origins of the Southern California Economic Partnership, on the other hand, are tightly connected to alternatives to vehicle travel, rather than the broad promotion of telecommunications. The work of the Economic Partnership is planned here to have a more precise targeting than the "smart regions" approaches taken elsewhere in California.

The Partnership's plan recognizes that the societal benefits of telecommunications deployment
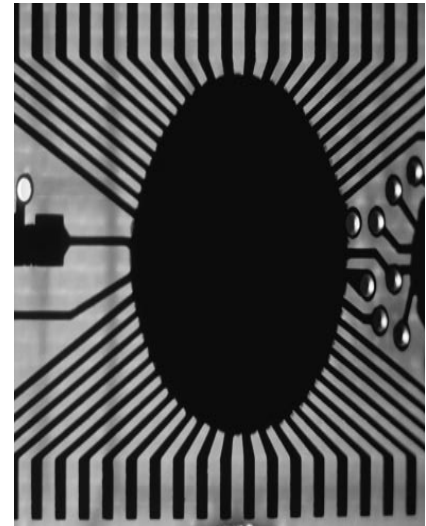
go beyond mobility and access. Depending on the application, these additional benefits include more efficient, effective, and equitable health care, education, public safety, and general government services, overall regional competitiveness, job creation, local business opportunity, and quality of life generally. But the mobility and access goals are the narrower, more difficult goals to achieve, and if they are to be achieved, they need to be pursued directly and forthrightly. In many cases, telecommunications applications that yield travel savings and improved access also yield other societal benefits. The reverse is not as often true. It is easy to conceive of telecommunications applications that provide individual, organizational, or societal benefits while increasing the demand for physical travel. Cellular phones in automobiles, online networks that describe attractive places and events, and telecommunications access provided in locations physically remote from likely users are examples.

7. Description of the Strategy

The Telecommunications Deployment Strategy (TDS) amounts to selective, interventional engagement by public interests in ongoing, robust market activity to change the operation and result of that activity, for example, to help the telecommunications industry to cause more telecommuting applications to be purchased and used sooner and better than would be the case without the intervention. The public interest of mobility enhancement is represented and carried out by the professional staff at The Partnership and the Association of Governments, under the guidance of the SCAG Regional Council and The Partnership Board.

In response to the mobility challenges and the telecommunications deployment opportunity, the TDS establishes two parallel, mutually supporting processes: One is the Strategic marketing Process carried out by The Partnership. The other is an Analysis and Planning process performed by the Association of Governments. These two processes, shown in **Exhibit 22,** create policy to influence the ongoing market process of telecommunications development, through the emergence of a mass market of telecommunications that causes accelerated deployment of telecommunications, resulting in a new regional telecom-travel mix.

A Plan to Achieve the Vision

The Plan strives to motivate the private sector toward investing more in mobility enhancement. A simplified schematic of the telecommunications marketplace is shown in the **Exhibit 16.**

In white is the basic process flow of the industry: The value of products and services leads to sales. Sales result in profits that lead to opportunities for deciding on new investments that improve organizational performance. A track record of performance improvement leads to higher perceived value of the underlying products and services, and further sales.

The step in shading shows the opportunity for additional decision-making and incremental investment in the specific telecommunications products, services, infrastructure, and applications that explicitly achieve enhanced mobility and access, in addition to organizational performance benefits like customer service and lower costs. Causing user organizations and the

telecommunications industry to focus on mobility enhancement is a key goal of the Strategy.

An important part of this focusing will be a research and analysis process that links telecommunications applications to changes in travel behavior. The scores of existing telecommunications applications (see **Exhibit 11**) need to be analyzed for their travel impact potential and a selection made of which applications to emphasize in Cluster activity. After an applications emphasis is chosen, the Cluster will work on a program of activity that accelerates the overall implementation of these particular applications.

The Strategy foundation is a growing understanding based on analysis of what is working in mobility-enhancing telecommunications applications, along with a well developed strategic marketing effort designed to meet the needs of this region.

The TDS sets up a process for collecting, organizing, analyzing, disseminating and otherwise responding to existing examples of telecommunications applications that enhance mobility. These examples of best practice are now being implemented in the marketplace in response to individual, household, business, and government demand for better performance that is largely uncoordinated with mobility issues.

To achieve a regional focus on mobility issues associated with telecommunications, the TDS is to build and use a common, shared Knowledge Base of telecommunications application experience.

Assembling a Knowledge Base of case studies is an important first step in deciding how to accelerate the deployment of such applications. The structure and organization of the Knowledge Base evolves over time in coordination with the Telecommunications Cluster participants.

Categories of knowledge to be Assembled

Information in the Knowledge Base is arranged into ten categories. The categories established here fit into a generic process model of how Telecommunications applications evolve over time. That model is presented as a flow chart in **Exhibit 17.**

VALUE of telecom industry products and services to telecom users

SALES to users to build their telecom applications

IMPROVED user performance from telecom applications

PROFITS to telecom industry companies and to users

DECISION-MAKING on new investment for performance improvement

INVESTMENT in new telecom products, services and applications

INCREMENTAL INVESTMENT in selected telecom that ALSO enhances mobility & access
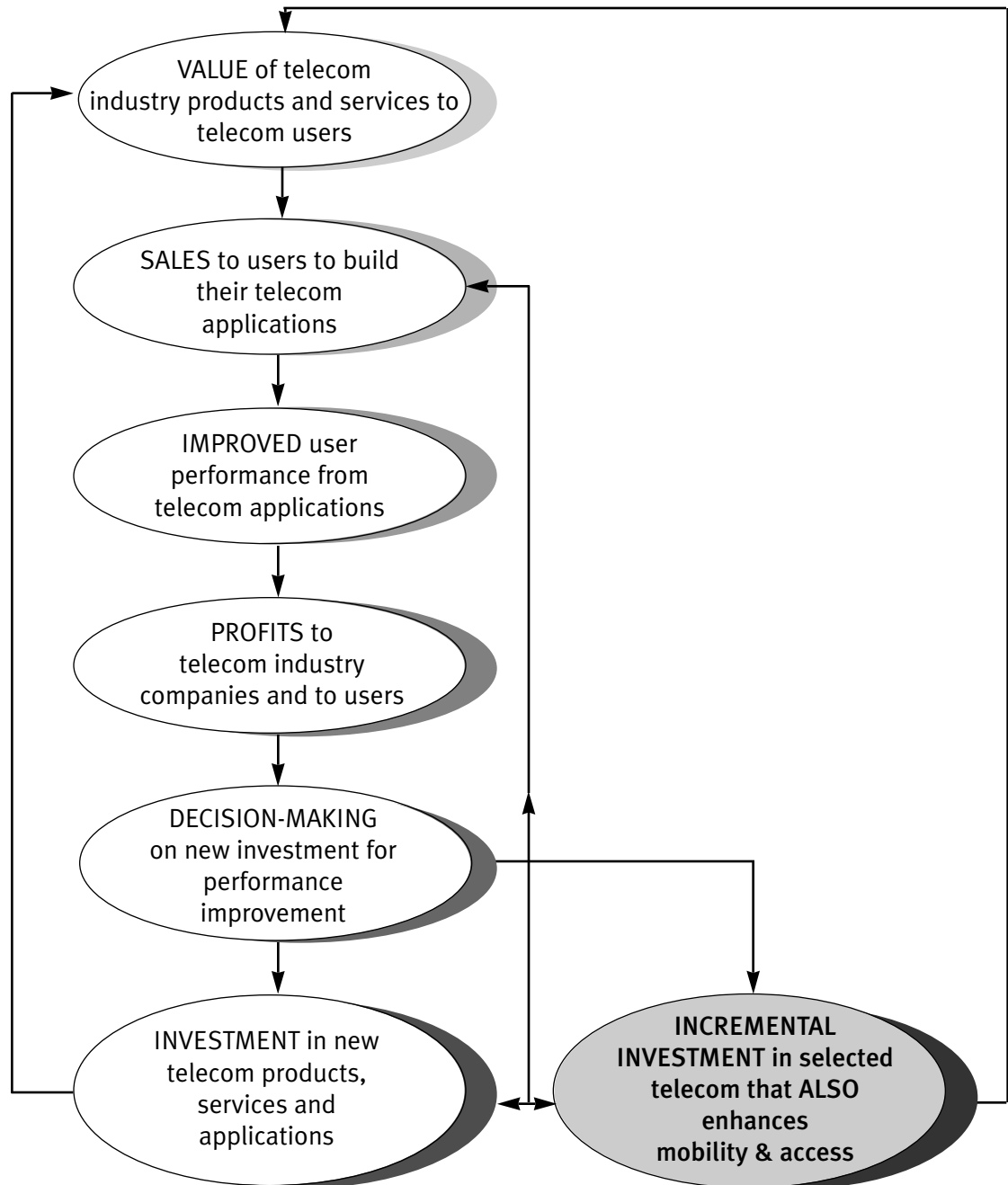
Exhibit 17:
Process Flow of Telecommunications Application Development and Deployment, and Knowledge Base Categories

Vendors products and services (8)

Begin here: Travel-related benefits of telecom applications (1)
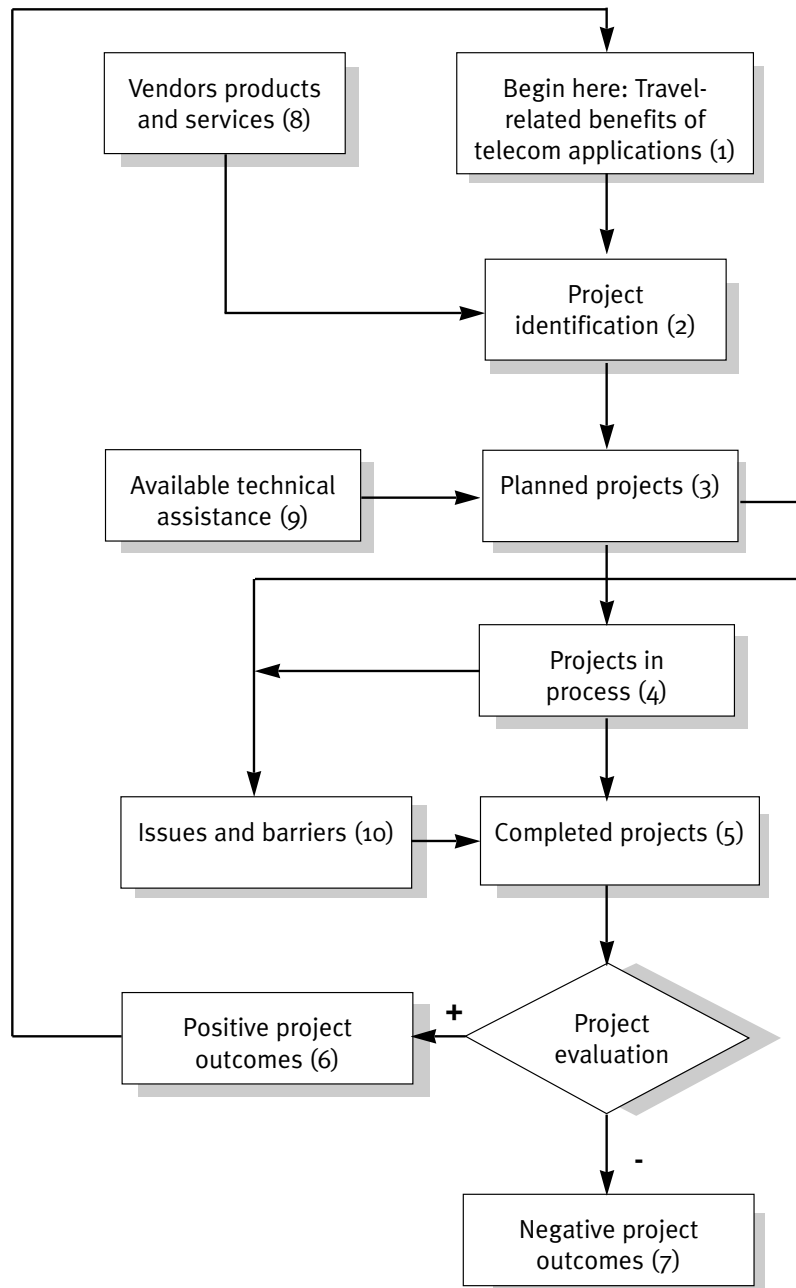
Numbers in parentheses refer to the description in the accompanying text

Project identification (2)

Available technical assistance (9)

Planned projects (3)

Projects in process (4)

Issues and barriers (10)

Completed projects (5)

Feedback loop: successsful examples motivate demands for extending applications to other organizations, in other locations and for other trip purposes.

Positive project outcomes (6)

+

Project evaluation

-

Negative project outcomes (7)

1. Identified travel-related benefits of telecommunications applications, some of which could be met through new telecommunications applications development/deployment (TADD) projects.

A beginning list of examples of such demands are as follows:

◆ "Replace Boring, Routine Trips With Electronic Substitutes." Electronic delivery alternatives to routine, scheduled appointments of any type encountered in service delivery and information access that would otherwise require a vehicle trip to a physical office.

◆ "Meet Electronically (Not Physically!) With Colleagues and Customers You Already Know." Teleconferencing procedures to replace vehicle trips by workers to off-site business locations.

◆ "Step Out Electronically From Places Where You Already Go." Electronic access provided within shopping malls, libraries, and community centers to other Southern California services that would otherwise require a separate vehicle trip.

◆ "Know Before You Go." More easy ways to use the telephone or other communications services to evaluate the usefulness of physical travel to a service delivery or meeting destination before setting out.

◆ "I Can See Your Face From Where I Am, So Why Visit?" Instead of climbing in a car, use a widely available, inexpensive, standardized, full color, full motion, video phone that works over existing telephone lines or cable TV connections.

◆ "Why Get Hassled in Traffic Going to The Mall, When I Can Buy Products While Sitting at Home and Have my Purchase Delivered?" Electronic, on-line shopping as a replacement for going physically to a retail location.

We fully recognize that travel-related issues are rarely the main driver of TADD projects. Non-travel demands like the following are usually more important to organizations than travel saving:

◆ Cost saving: labor, materials, facility space, energy

◆ Improved customer service.

◆ More productivity: improved ratio of output to input

◆ Higher quality of service or product.

◆ Compliance with government regulations for information collection and record keeping, notification, timely performance

◆ Competitiveness: matching or exceeding a competitor

2. Potential telecommunications applications development/deployment projects that organizations have identified. Examples:

◆ Library identification of electronic access to its resource catalog from home and business locations.

◆ A bank that is contemplating establishing electronic home banking as a competitive response to other initiatives in the financial services industry.

3. Telecommunications applications development/deployment projects that organizations are planning now. Examples:

◆ A hospital that is writing the RFP for procurement of hardware and network services for the monitoring of patients who are recovering from surgery at home.

◆ A community college that is in the process of designing a distance learning program for middle managers that reaches corporation employees at their desks in local business offices.

◆ The Association of Governments Geographic Information System (GIS) Computer ACCESS Program that is planning to deploy computers in public locations to provide access to Association maintained information.

4. Telecommunications applications development/deployment projects that are in the process of implementation now. Examples:

◆ A local government agency that is in the process of linking some of its internal databases

to the computer of an Internet services provider in order to offer 24 hour per day access by the public to vital records.

◆ A small retail chain that is building an on-line shopping service on the Internet as a growth alternative to opening more branch locations around the Southern California region.

5. Recently completed projects, that can be evaluated as to their trip-related effects. Examples:

◆ A private building security company that has installed video monitoring in a dozen client locations under contract for 24 hour protection from intrusion, fire, and other threats.

◆ A business services sales organization that has shut down three floors of office space in a downtown office tower in order to put its computer and cellphone-equipped sales force closer to customers.

6. Completed projects that are successful according to the organization that executed them, and that in addition can be shown to reduce physical travel in the Southern California region. Examples:

◆ A county-wide criminal justice system that uses video arraignments to save thousands of police hours and several million vehicle miles per year.

◆ A utility agency that is actively marketing automatic monthly withdrawal of billed charges from customer checking accounts, simultaneously with shutting down its payment window locations where citizens could hand carry their payments.

7. Completed projects that may or may not be successful to the organization that implemented them, but that turn out to be disappointing in their travel saving results. Also, projects go here that save travel, but that are unsuccessful overall to the implementing organization because of other criteria. Examples:

◆ An unnamed telemarketing operation that is abandoning its attempt to operate a distributed call center operation where many workstations were located in employees' homes.

◆ An on-line shopping service that is withdrawn from the market because of a lack of consumer response.

8. Telecommunications-related hardware, software, and services that are offered by vendors as component inputs to TADD projects. This database amounts to an ongoing inventory of the particular technology components that the Strategic Plan is aimed at deploying. Examples:

◆ Network services offered by Pacific Bell, GTE California, Continental CableVision, Pacific Lightwave, Nextel Communications, and others.

◆ Internet services offered by Earthlink Network, Inc., Netcom, MCI, and others.

◆ Software offered by Performigence Corporation, Quarterdeck, Microsoft, and others.

◆ Video communications hardware offered by Alpha Systems Laboratory, Vivo, Intel, and others.

9. Consulting and other technical assistance (not tied to specific products) that is available to help organizations in planning and implementing TADD projects. Examples:

◆ Multimedia development services offered by Access Media and others.

◆ Telework Facilities Exchange development services offered by Siembab & Associates, and others.

◆ Training services in telecommuting offered by the Southern California Telecommuting Partnership, and others.

10. Issues (including barriers and unnecessary costs) relevant to the implementation of TADD projects that go beyond the influence of any one organization. Examples:

◆ Specific regulatory issues and barriers, such as the Brown Act in California.

◆ Technology gaps.

◆ Technical assistance gaps.

◆ Societal downsides, such as the reports that communicating mobile information technolo-

gies are causing longer working hours at the expense of time available for family and friends.[9]

The most prevalent record type will be the case study of a telecommunications application development/deployment (TADD) project. Each case study will follow a standardized format and be three to four pages in length, as shown in **Exhibit 18.**

Examples of case study entries for the Knowledge Base are provided in (Appendix B.)

Other standardized formats can be developed for listings of technology products and services that are component parts of applications, and of technical assistance offerings that are available to support the development of applications.

Other inventories can be conducted as needed in response to analysis of applications yielding barriers, opportunities, and issues worthy of Cluster attention. Examples of supplementary inventories that may eventually prove useful include infrastructure systems (telephone company facilities, cable TV facilities, wireless facilities); attached network terminals (kiosks, home computers, public internet access points, set-top boxes for televisions); content providers (local governments, regional retailers, health services, higher education systems); and market channels (consumer electronics retailers, value-added dealers in specific vertical markets, neighborhood training centers). Such inventories should not be conducted however unless they are part of addressing an issue that is identified as blocking the deployment of mobility-enhancing applications.

Criteria for choosing case studies for the Knowledge Base

A main criterion for putting a particular TADD project into the Knowledge Base is that the project operates in a way that is likely to have positive impact on accessibility by providing alternatives or improvements. Another way of saying this is that its operation carries with it the logic of mobility improvement.

Other criteria include availability of data, willingness of the project sponsor to provide data, and

involvement of private sector vendors in publicizing the project. Vendors promote their own products and services by describing and disseminating case studies of successful applications development/deployment projects.

Organization and dissemination of knowledge in a World Wide Web Site

Building and using a successful telecommunications application (a World Wide Web site on the Internet) can be a primary information management and dissemination tool for the TDS.

The structure and format of the model flow chart and the underlying information in the ten categories provide content suitable for building a Web site. When arranged as a flow chart (see **Exhibit 17** earlier), the information categories describe the steps in a process model of how TADD projects can be emphasized by the Economic Partnership and carried out by individual organizations in the Region.

The World Wide Web site should be made available at public access sites (libraries, community centers, schools, lobbies of government buildings) throughout the six-county Region. The existing Association of Governments GIS Computer ACCESS Program is a potential vehicle for doing this, see (Appendix B.)

At the information layer just below the top-level flow chart, information should be presented in structured, categorized, indexed formats. Hot button linkages can be created to take users to other Web sites that are operated under the control of vendors and other parties.

The World Wide Web is a good tool for disseminating the TDS Knowledge Base because of its growing use in the economy generally. There is a growing private sector industry that builds understanding, acceptance, usage, and technical support of users of the Internet through private sector initiatives. The newspaper industry, the banking industry, the public library community, the public schools, the home computer industry, and the consumer on-line services industry are actively taking steps to build Web usage. For example, libraries and public schools are installing more

Web access with each passing month. As another example, home computer manufacturers are bundling modems and Web access software tools with every home computer sold. The recommended TDS Web Site rides on these existing efforts, and does not contemplate incorporating additional action to build Internet usage, except possibly for participation in the Association of Governments ACCESS program following necessary approvals.

The Web site for information dissemination has the secondary benefit of reaching population segments that are younger, well-educated, high income, and open to new ideas. These people are likely to be naturally high in vehicle trip generation, but also able to understand, buy, and use technological alternatives.

There could be two information input buffers in the Web site.

◆ An input buffer where any and all can offer commentary and additions. This input buffer will be evaluated and massaged by staff into additions to the above categories. The input buffer will be available for all to see.

◆ A private input buffer for Telecommunications Cluster Advisory Group and forthcoming Sub-Cluster Group members who are working in particular user industries. This input location would be similar to the public one, only not visible to the general public, again out of which information will be moved to one of the ten organized databases under the flow chart elements.

This Web site once implemented would provide the data structure and central information clearinghouse function for the execution of the Strategic Telecommunications Technology Deployment Plan.

The World Wide Web site would have the flow chart on or near the top level. Users would click on a box in the flow chart to see the particular database of information "underneath."

The proposed Knowledge Base Web site provides an additional forum for expanding relationships between telecommunications technology suppliers and users.

Steps in the Analysis & Planning Process of the Strategy

To create a continuing long-term learning and focusing process that will cause the right incremental telecommunications investments to be made by both the vendor industry and the users of telecommunications who build applications, the Telecommunications Deployment Strategy has an Analysis & Planning process that incorporates these steps:

1. Build a Knowledge Base: Identify naturally-arising, market-driven telecommunications applications in Southern California or elsewhere that influence mobility in the direction of trip reduction and alternative electronic accessibility. This compilation of applications is at the heart of the Analysis and Planning process, as shown in **Exhibit 19**.

2. Analyze applications: Select and analyze the most promising of the specific projects identified in the previous step to quantify actual mobility impacts. An example of a specific project is Los Angeles County Superior Court contracting with the vendor Ameritech Corporation for the provision of interactive court services, enabling law firms to file and retrieve documents electronically, as well as search documents and civil indexes. In thinking through this specific application, a series of questions must be considered: How much trip saving will this particular application accomplish? How much trip making can be influenced by implementing interactive court services in all of the courts in Southern California? How does expanding this application compare in trip impacts with other applications?

One point of the analysis is to link dominant trip purposes to telecommunications applications. How this could be done is shown in the matrix illustrated in **Exhibit 20**. The focus of this matrix is on aggregation of common barriers and issues across multiple applications in order to determine the leverage points where the Telecommunications Cluster should push and take further action to accelerate telecommunications deployment. A key criteria for selecting applications for such further action is a judgment on the degree to which they do something posi-

Exhibit 18:
Format of telecommunications application case studies in the Telecommunications Cluster Knowledge Base

◆ Title of project

◆ Contact person, address, phone

　　Electronic addresses
　　electronic mail
　　hot link to further on-line documentation
　　hot link to the application itself, if available.

◆ Application type. Examples: telecommuting, teleshopping, public safety

◆ Implementing organization(s)

◆ Mission: Mission/business of the organizations involved

◆ Date when project became operational

◆ Purpose of the application

◆ Description of users (if workers: job titles, functions; if consumers: geographic location, demographics)

◆ Number of users

◆ Total potential universe of users in Southern California region

◆ Equity considerations: Describe how this application differs in its market acceptance across economically advantaged and economically disadvantaged people. Also, describe whether there is a public interest in promoting access and use of the application by economically disadvantaged people.

◆ Application accomplishments: Focusing on what the implementers are seeking, and spinoffs that may or may not have been anticipated.

◆ Description of the chain of events leading to mobility impacts

　　Example: customers receive what they need at home and don't have to come to the service center.

　　Example: couriers are no longer used to move the data files between offices

◆ Quantification of mobility impacts

◆ Technology overview

◆ Availability of the application to mitigate the effects of earthquakes and other transportation system disruptions.

◆ Technology vendors and technical assistance providers

◆ Facility location

◆ Facility location changes associated with this project (if any)

◆ Block diagram of the application, emphasizing geographic locations and information flows that replace physical travel

◆ Costs

◆ Sources of funds

◆ Economic indicators vis a vis technology users and technology suppliers

　　jobs
　　sales
　　profits
　　new companies formed
　　units sold
　　employment mix

◆ Market size: Estimated Southern California market size for this application, and present market penetration of implementations of this application, including this example and all other examples.

◆ Issues and barriers: Those overcome, those still hindering, and those anticipated

World Wide
Web Site

Tracks telecom
marketplace

Mobility impact
measurement

Sets Telecom
Cluster Agenda

Economic
benefit
measurement

Vendor
marketing
channel

Citizen & business
input forum

Technical
assistance
forum

Revenue
generation

tive for reducing trips and improving mobility. The eventual effect of the various actions that the Telecommunications Cluster takes amounts to the delta in telecommunications deployment and resultant travel impacts that amounts to the difference between the baseline and the RTP "Plan."

Looking more closely at **Exhibit 21,** the matrix is an outline for the process of taking the next analytic steps after compiling case studies for the Knowledge Base of applications. Travel destinations, travel purposes, and telecommunications applications that serve those destinations and purposes are listed toward the left side of the matrix. The matrix is filled in illustratively across the row describing travel to government buildings. The squares of the matrix are analytic categories and steps, where more information may be developed than can fit into a small space.

Several telecommunications applications that could replace trips to government buildings are indicated in the column in the middle of the matrix titled "Example applications in the Knowledge Base." The applications, which are described in Appendix B, are the Davis Community Network and the Association of Governments ACCESS project. To the right of that entry are listed a number of characteristics and issues related to these two applications. Partially filled in for the example, these characteristics and issues include travel savings potential, economic impacts, social impacts, and a number of potential barriers -- specifically, human awareness and skill gaps, unknowns reducible through research, local government regulations, federal and state government barriers, infrastructure, service availability, and user equipment barriers.

Exhibit 20:
Draft Analysis Tool for Determining Best Opportunity Targets for Telecom Cluster Action

Travel Destination	Estimated Relative Share of Daily Trips for this Destination Type	Travel Purpose	Traveler Target	Code	Telecommunications Applications for Mobility and Access Enhancement (Taken from the Knowledge Base)	Example Applications in the Knowledge Base 2020	Technologies used and Regional/ National Market	Southern California Travel Saving Potential,	Positive and Negative Economic Impacts
Place of daily work	High	Reporting to Work	Commuters	1	Telecommuting from Home			6.3% of Commute Trips	
Place of	High daily work	Reporting to Work	Commuters	2	Telecommuting from an Alternative Office				
Shopping Malls	High	Going Shopping	Shoppers	3	Mall Shopper Information Network: check stock availability, parking, and crowds before you go.				
Shopping Malls	High	Going Shopping	Shoppers	4	Once there, use kiosks to reach other services and avoid other stops.				
Shopping Malls	High	Going Shopping	Shoppers	5	Remote electronic tele-shopping and home delivery				
Worksites, Restaurants other Business Meeting Venues	Medium	Face-to-face interaction during work day	Professional Workers	6	All modes of teleconferencing: audio, video, document, whiteboard				
College & University Campuses	Medium	Reaching a Learning Environment	Adult Students	7	Wider access to course offerings through Networked Classrooms				
College & University Campuses	Medium	Retrieving Learning Resources	Adult Students	8	Remote access to library, study groups, other resources				
College & University Campuses	Medium	Going to place of registration	Adult Students	9	Remote registration				
High Schools	medium	Reaching off-site resources	Adolescent students	10	Remote access to course offerings and resources				
Medical Offices	medium	Going to a health care facility	Patients	11	Reduce patient visits by remote consultation, monitoring treatment				
Medical Offices	medium	Going between medical facilities	Medical personnel	12	Transmission of medical diagnostic images; remote participation in procedures (tele-surgery, etc.)				
Libraries	low	Retrieval of documents	Customers	13	On-line catalogs and electronic document access				
Workplaces, Homes	low	Delivery of a physical document	Many worker types & couriers	14	Electronic transmission, verification, signatures				
Customers & Prospects in the Field (Industrial & Business Sales)	Low	Face-to-face sales calls	Outside sales professionals	15	Pre-visit remote monitoring and qualification. Electronic interaction for followup. Sales literature on line.				
Grocery Stores	Low	Buying groceries	Shoppers	16	Electronic ordering and home delivery				
Cinemas, Video Rentals, Arcades	Low	Entertainment & recreation	Consumers	17	Enticing, in-home telecom-based alternatives to going out				
Government Buildings	Low	Obtain forms, maps, other	Customers: business people and ordinary citizens	18	Remote government information retrieval from homes, business, and additional public places (CELLE TO THE RIGHT FILLED IN AS AN EXAMPLE TO SHOW HOW THE KNOWLEDGE BASE CAN BE ANALYZED)	Davis Community Net; ACCESS Project	Fax on demand; e-mail; Internet Web; Community Networks	A KEY RESULT FROM CARRYING OUT THE PROCESS	Structural employment shifts; reduced governmental spending and workload burden
Government Buildings	Low	Attend hearings and events	Customers:	19	Remote viewing and participation in hearings and other events				
Government Buildings	Low	Access service transactions	Customers:	20	Teleservice transactions from homes and public kiosks				
Banks, Financial Services	Low	Obtain cash & make deposits	Customers:	21	Teller machines everywhere. Credit and debit cards as cash substitutes. Direct electronic deposit.				
Banks, Financial Services	Low	Apply for loans, open accounts	Customers:	22	Remote applications by mail, telephone, fax, computer modem, kiosk				
Prospective Employers, Job-Hunt Stops	Low	Pick up applications, go to job interviews.	Job-seekers	23	Electronic access to position listings. Video screening interviews.				
Real estate for Sale or Rent with Listing Agents	Low	Visit and show listed properties	Prospects; real estate agents	24	On-line photos for screening before touring and showing.				

Potential barriers that could be focus for Telecom Cluster Intervening Action

Travel Destination	Societal impacts mobility, access, & economic	Awareness gaps	Unknowns reducible through research	Local government regulatory involvement	State & Federal government caused barriers	Telecommunications infrastructure barriers	Telecommunications service availability barriers	End user barriers	Human skill barriers	Other barriers	Grade the overall potential for improvement via Telecom Cluster Action	Other applications with similarities, synergies	Options for public sector action	Options for private sector action	Conclusion public sector action	Conclusion private sector action
Place of daily work																
Place of daily work																
Shopping Malls																
Shopping Malls																
Shopping Malls																
Worksites, Restaurants other Business Meeting Venues																
College & University Campuses																
College & University Campuses																
College & University Campuses																
High Schools																
Medical Offices																
Medical Offices																
Libraries																
Workplaces, Homes																
Customers & Prospects in the Field (Industrial & Business Sales)																
Grocery Stores																
Cinemas, Video Rentals, Arcades																
Government Buildings	Better service to citizens	Among government officials & consumers	Status of standards; state of the art	Obsolete statutory requirements for physical access		None	None	Home computers & fax machines efforts	Consumer formulation of information needs, design of presentation interfaces	Lack of government investment dollars	A KEY RESULT FROM CARRYING OUT THE PROCESS	Numbers 13, 14, 15, 20, 22, 23	Intergovernmental development projects sharing of successful methods	Transfer of technology from leading business focus of mainstream marrketing	A KEY RESULT FROM CARRYING OUT THE PROCESS	A KEY RESULT FROM CARRYING OUT THE PROCESS
Government Buildings																
Government Buildings																
Banks, Financial Services																
Banks, Financial Services																
Prospective Employers, Job-Hunt Stops																
Real estate for Sale or Rent with Listing Agents																

These cells would be filled in with information from the Knowledge Base

from professional staff research at The Association, and

from Telecommunications Cluster Advisory Group deliberations

Columns further to the right indicate a place to grade the applications for the overall potential for expanded, accelerated improvement via the Strategy, and a place to make the linkage to other telecommunications applications with similar characteristics and barriers. This last column would be filled after a number of applications are analyzed. The bottom line on the whole process comes further over to the right with a column to list options for public sector action and options for private sector action. The final two columns on the right are the place where decisions to take action in the public or private sectors can be indicated.

3. Determine leverage points: From the analysis of specific projects, determine the characteristics of the telecommunications applications that produce trip reductions. These characteristics are potential leverage points for further action by the Telecommunications Cluster. For example, what technologies produce the greatest trip savings? What are the characteristics of trip types that are most amenable to substitution? Do organizational characteristics matter? Are there geographic factors?

These evaluated projects can yield the barriers and gaps that are the most worthwhile targets for attention and action by the Telecommunications Cluster. Addressing these barriers and gaps will expand the number and enhance the quality of such projects, and thus improve mobility.

For example, assume that interactive court services is found to produce significant trip savings: Are there other courts in the six-county region that have not yet implemented such services? A barrier may be simple lack of awareness of the technological potential on the part of other court administrators. Are there collective public interest policies and activities that can be initiated and facilitated by the Telecommunications Cluster or by the Association of Governments? For example, the professional societies of court administrators could be the subject of educational and marketing activity by the private sector suppliers of telecommunications technology.

Furthermore, groups of project types sharing common technological characteristics need to be assessed for leverage points of public interest action. For example, interactive court services may be very similar to interactive services around

other government regulatory agencies and around private sector services like insurance, banking, and on-line shopping. When assessed, all of these applications may be found to be blocked by infrastructure gaps, organizational readiness and capacity gaps, or technology barriers such as lack of standards for electronic signatures that carry the legal weight of blue ink on paper.

Interactive court services and related applications are only an example. The strategy consists of an evolving, increasingly more powerful and regionally-inclusive work process of collecting many case studies of telecommunications applications in the Knowledge Base, and then assessing these cases for leverage points and action by the policy makers, and the stakeholders.

4. Design actions: Conceive, analyze, and choose those specific public policies and actions that would cause more and better projects of the identified type.

In the example of interactive court services, an education and marketing program could be designed by the Cluster in cooperation with technology vendors. Or, because the Southern California market is so large and significant, the Telecommunications Cluster might reasonably form a task force to accelerate the development and implementation of an industry standard for digital electronic document signatures (equivalent to signing with a pen on paper) that would support a number of mobility-enhancing telecommunications applications that are currently blocked. The Smart Valley effort in the San Jose area has worked on accelerating industry standards for electronic transactions between firms.

Other barriers that conceivably, but not necessarily, stand in the way of telecommunications applications development and deployment include inadequate residential and commercial telecommunications infrastructure, gaps in the provision of common carrier services over the infrastructure, inadequacies in information content provision, insufficiently cost-beneficial network attachments (personal computers, smart televisions, etc.) available for purchase by households and businesses, lack of attention to user friendliness on the part of applications developers, and insufficiencies in availability of private or public investment capital.
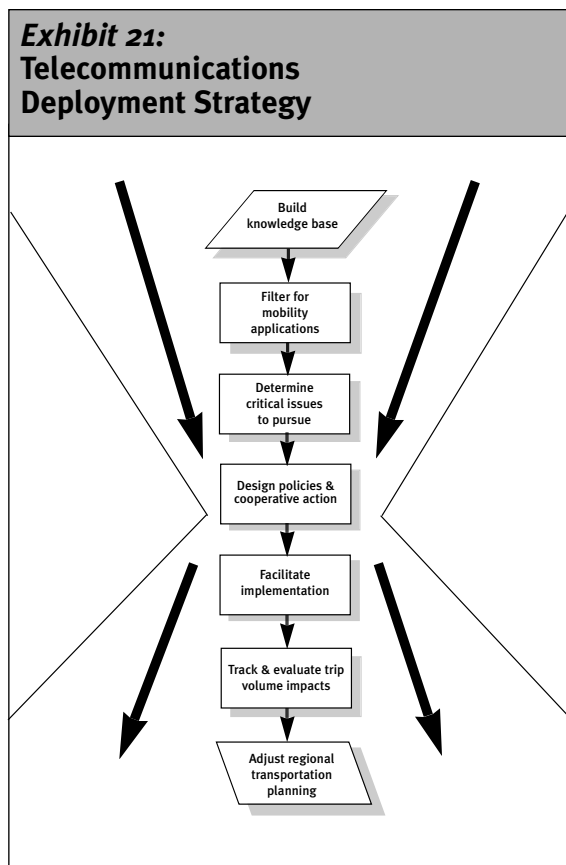
5. Facilitate implementation: Design and implement those actions and policies by assigning responsibilities and providing resources to carry them out. Depending on the scope and scale of the selected activity, this step could be formidable. The sum of all such activities across all targeted telecommunications applications would constitute a major share of the work program of the strategy.

6. Measure results: Track and evaluate actual mobility impacts that result. For example, if trip making in connection with courts is chosen as a target for public policy and programs that accelerate the deployment of new telecommunications applications, then the mobility effect of these applications as they are implemented across the courts in the six Southland counties should be tracked, measured, and assessed.

7. Input to planning: Findings from the steps described here would be continuously shared with the modeling staff at the Southern California Association of Governments. By focusing on an understanding of telecommunications applications' impacts on particular trip types, these professionals can develop a methodology to better estimate and forecast the overall trip generation consequences that result from telecommunications technology development and applications throughout the region. This methodology would be used in the development of future editions of the Regional Transportation Plan

These steps are shown in the **Exhibit 21** flow chart for the Telecommunications Deployment Strategy. The flow chart illustrates that the Strategy funnels a large mass of technology and application possibilities down to a specific set of high leverage initiatives in the marketplace. These initiatives attempt in turn to spur a wide array of private sector activity that yield a large impact on patterns of movement and remote electronic access that substitutes for movement.

Exhibit 21:
Telecommunications Deployment Strategy

Build knowledge base

Filter for mobility applications

Determine critical issues to pursue

Design policies & cooperative action

Facilitate implementation

Track & evaluate trip volume impacts

Adjust regional transportation planning

8. 2020 Vision of tne Strategy in Operation

Here is the Telecommunications Deployment Strategy 2020 vision for making the Southern California region a leader in the use of telecommunications for mobility enhancement:

1. Mobility enhancement is widely perceived as an available additional benefit of telecommunications applications.

2. Users and vendors of telecommunications technology understand how to use telecommunications to enhance mobility, and consider this potential as they sell and build applications.

3. Established information dissemination mechanisms exist for easily finding the details of how organizations and people throughout Southern California are using telecommunications to save travel.

4. It is easy to find a wide array of professional technical assistance in designing, building, and operating telecommunications applications that enhance mobility.

5. The rate of growth of operational applications that are saving travel is greater in Southern California than anywhere else in the world.

6. The use of telecommunications by people and organizations for mobility enhancement has reached critical mass penetration.

7. Transportation and telecommunications on an equal footing in comprehensive planning at Association of Governments, with recognition that they are complementary ways of fulfilling transactions, interactions, relationships, and information exchanges.

8. The Association's social-economic-mobility-access real-time micro-simulation model of the Southern California Region fully encompasses telecommunications as well as transportation. The operation of the model is fully visible to anyone via the World Wide Web.

9. Public sector planning to influence telecommunications deployment has to be based upon deep insight and subtle indirect leverage. Operational data on telecommunications functioning is provided as a matter of law to the Association for its simulation model.

10. In the Southern California region an internationally prominent network-enabled think-tank has evolved, the Telecommunications Mobility Institute, with senior fellows based worldwide working on telecommunications-transportation relationships. The core staff and the knowledge server are based in Southern California.

A more focused vision for the Association is the following:

To achieve this vision, the Partnership's Telecommunications Cluster intends to become the most authoritative, widely-known broker of know-how, skills, information, and other resources for implementing mobility-enhancing telecommunications applications. This statement was developed by the Telecommunications Cluster Advisory members at a November 8, 1995 cluster meeting. The Cluster will continuously build linkages to private sector firms which are marketing products and services that implement these applications. Continuing liaison and cooperation with other mobility-focused developers of telecommunications applications, for example, the Southern California Telecommuting Partnership, the Playa Vista Development, and the San Diego Cities of the Future.

9. Benefits of the Strategy

1. Provides the focus of discussion and activity for the Telecommunications Cluster participants, including the Advisory Group, and any other groups that could emerge as needed; such as the Support Cluster Groups, working groups, and task teams.

2. Builds leadership understanding and consensus on how telecommunications deployment happens, what would be a better pattern (path and pace) of deployment, and what should be done to make that better pattern occur.

3. Establishes a foundation for analyzing and determining where and how a public-private partnership should intervene to accelerate ongoing processes (infrastructure deployment, equipment availability, applications development, or human capacity building) that would most efficiently accelerate ongoing telecommunications deployment.

4. Defines the specific telecommunications markets and product areas where the Telecommunications Cluster should focus for maximum impact.

5. Supports Association of Governments measurement and evaluation of telecommunications deployment impacts.

The TDS provides for the creation of a Knowledge Base of specific travel-saving projects that can be quantitatively evaluated for trip savings and then extrapolated to area wide travel savings as a part of monitoring the performance of the Regional Transportation Plan.

Focusing on quantifying the travel behavior impacts in a series of particular real world telecommunications applications would be helpful in learning how to quantify telecommunications impacts at a regional level. Judgments can now be made about the likely future impacts of telecommunications deployment on trip making generally, but experienced analysts may vary substantially in their prognoses, because of differing implicit assumptions about the impact of individual applications. The Strategy described here corrects this problem.

6. Provides an organized, research-based input to the process of forming new Telecommunications working groups.

7. Supports technical assistance to organizations in telecommunications application development.

8. Links to the revenue and profit interests of the private sector.

The Knowledge Base will be full of case studies of telecommunications application development/deployment projects that are motivated by business interests, including revenue and profit generation. The database also includes product and service offerings from the private sector. The database and its structuring provide a linkage between existing everyday business interests and the Association/Partnership public policy intent of modifying access and mobility habits. More directly, the proposed Internet Web dissemination of the database information amounts to the provision of a new marketing channel for the private sector suppliers to reach telecommunications applications developers. Vendors have their products and services listed in a neutral format, and then the Information Center Web site would provide for one-click hot links to vendors' own promotional, marketing, and ordering Web sites.

9. Support disaster preparation.

The Strategy recognizes that a focus on promoting telecommunications applications for mobility enhancement in normal times simultaneously offers a strategy for mitigating transportation disruptions in the abnormal times of earthquakes and other transportation and organizational facility disruptions. When the New York City World Trade Center was hit by a terrorist bombing several years ago, the affected firms which coped best when their offices were closed were the ones that were already practicing telecommuting.

10. Work Plan for Strategy Implementation

This is the recommended work plan to follow in implementing the Telecommunications Deployment Strategy described here.

Work Plan steps

Southern California Economic Partnership: Continue periodic meetings of the Telecommunications Advisory Group.

The charter members of the Advisory Group are listed in **Exhibit 4** earlier. The private sector members were selected from telecommunications service firms serving a variety of telecommunications applications, or otherwise having a broad view of applications. The Group also included public sector officials and managers. The membership can be augmented at any time to bring in members with more specialized perspectives that become important as particular groups of applications are chosen for attention.

The main continuing focus for the Advisory Group should be to provide advice and counsel to The Partnership staff and board on how to influence the dynamic telecommunications market toward a greater emphasis on mobility improvement.

Through an on going review process of applications to determine groups of them that should and could be accelerated by removing barriers (such as infrastructure gaps), by providing technical assistance, or by organizing additional marketing activity.

Candidate applications should be brought before the Advisory Group in a uniform format by a professional staff that documents applications in a consistent fashion highlighting issues that impede deployment. The Advisory Group members themselves can provide input to the professional staff on applications they know about stemming from the work of their organizations.

Partnership: Applies the same market development strategic planning to each of the five technologies it has been given the mission to accelerate. The approach is multi-disciplinary, totally integrated, constantly evolving, and consists of:

Association : Establish a telecommunications applications Planning & Analysis function.

This function at the Association, would provide the professional resources needed to document applications that collectively form a Knowledge Base that guides Telecommunications Cluster activity. The contents of this Knowledge Base becomes part of the substantive content of the Web site.

Two full-time equivalent analysts, one junior and one senior, are an appropriate starting level of effort for this function.

Association: Continue collecting information on existing telecommunications applications.

The Telecommunications Cluster needs to base its work on an understanding of telecommunications applications. This understanding requires a steady flow of data on existing applications.

A program of media and literature scanning could be one source of leads. The National Information Infrastructure Awards program has already offered to provide leads to applications that claim travel savings as an effect.

Also, a brochure could be created and distributed that explains the kind of applications that the Cluster is seeking, and the benefits in promotion and technical assistance that the Cluster offers in return to applications developers who provide information.

Association: Document case studies of telecommunications applications according to the format described earlier.

Documenting case studies means filling in the standard template that organizes each Knowledge Base entry with data from real world applications.

Association staff screen candidates for preliminary prima facie indications of mobility enhancement effects. Staff further analyzes those that appear to have mobility enhancement impacts in order to verify and quantify these impacts.

Association: Analyze case studies of telecommunications to find leverage points for collective action by the Telecommunications Cluster.

Staff collects and analyzes case studies with the goal of finding common barriers that cut across several cases.

Association: Feed analysis results into the agenda of the Telecommunications Advisory Group meetings for discussion and action.

Results of the analysis that come out of the preceding step should be in the form of identification of barriers and opportunities for technical assistance or marketing action that are common across a group of telecommunications applications. Options for action should be well reviewed and discussed at Advisory Group meetings.

Partnership: Establish working groups and task teams to take barrier removal, cooperative marketing, and technical assistance steps that emerge from the analysis of applications and deliberations of the Advisory Group.

These teams would be made up of stakeholders in firms and government agencies that are involved in telecommunications deployment.

The teams could work on projects large and small, depending on what the analysis and the Advisory Group deliberations determined were good intervention steps to take. A small project might be aimed at correcting a technical problem in pending legislation in Sacramento or a city council. A large project would be to create a partnership between content providers, service providers, communities, and customers to build a new travel-saving information service on a community network service such as Valley-Net or the Los Angeles FreeNet.

Another possible large project for a working group of the Telecommunications Cluster would be facilitation of an infrastructure upgrade in a particular geographic area. For example, a working group could provide assistance in negotiations between a municipality and telecommunications providers to leverage the procurement of new wiring for government facilities into the construction of a citywide high capacity network supporting interactive media transmission for all business and some residential locations. End user equipment vendors might provide discounts to users to provide incentives for use of the upgrade cap[abilities. This upgrade could be coordinated with an accompanying research effort to measure travel impacts upon users of new services and applications that are made possible by the upgrade.

Another kind of project would be experiments that take an action that encompasses some logic of mobility improvement, but also some uncertainty as to the size of the impact. For example, suppose a special marketing effort for a telecommunications service like ISDN were made in a limited geographic area. The response of consumers to the offer could be measured, and then some survey work could be done among both takers and a control group of non-takers to discern what changes result in travel patterns.

Partnership: Create a Telecommunications Model City Starter Kit

In line with an educational thrust developed in other Clusters of the Southern California Economic Partnership, the early findings from the analysis of telecommunications applications and follow-on deliberations of the Advisory Group could be turned into a "Telecommunications Model City Starter Kit" for municipal government officials. The kit would be a booklet that would be designed to assist Southern California cities to decide upon and carry out a series of action steps that advance the deployment of telecommunications applications by local businesses and other organizations, and by local government agencies themselves.

Following the emerging example of the Electric Vehicle Model City Starter Kit, a working outline for the Telecommunications Model City Starter Kit would look like this:

◆ Why Become a Telecommunications Model City

◆ The Acts and Regulations Supporting Telecommunications Deployment

◆ The Key Players Supporting Your Participation

◆ The Key Programs Supporting Your Participation

◆ Telecommunications Technology Update

◆ Support from Local Telecommunications Service Providers

◆ Telecommunications Case Studies

◆ How to Become a Telecommunications Model City

◆ Funding Support Opportunities and Tax Incentives

◆ Telecommunications Model City Recognition

The subject of general telecommunications policy for municipalities has been previously addressed by the California League of Cities in its Model Telecommunications Policy. The topics covered in the League's Model Policy are universal access, role of the city in regulatory structure, compensation for use of public rights-of-way and negative impact on local infrastructure, cities as users/providers of telecommunications services, adequate spectrum capacity for public safety and other public uses, FCC certification of local franchising authority, and privacy.[10] From the point of view of this Plan, these are all general telecommunications policy issues that need to be verified as important barriers to the deployment of trip-saving telecommunications applications. Not all of these issues will pass this test.

Following the thrust of the Partnership's Telecommunications Deployment Strategy generally, the Partnership's starter kit should address aspects of telecommunications that bear on enhancing physical movement and electronic access, as opposed to the whole field of telecommunications generally, which the League Policy attempts to address.

Partnership: Manage activities of the working groups and task teams.

Products of these activities could include working with one or more local municipalities to assist them in carrying out the steps that are outlined in the Model City Starter Kit just described. Whether or not in the context of a model city, working groups could take steps to help cities promote mobility-enhancing telecommunications, such as the use of the Internet to disseminate government information for which citizens would otherwise have to visit city hall, or residential housing and zoning codes that encourage telecommuting.

Association: Initiate special research projects as needed.

Examples of such project include surveys of users to validate findings from analysis of telecommunications applications and special studies to incorporate the effect of telecommunications applica-

tion deployment into transportation models, such as the effects of the cashless society coming from growing use of debit and credit cards.

1. Deployment education and guidance in the form of Model City Starter Kits that contain information and implementation worksheets, and training and safety requirements and curriculum.

2. Workshops and outreach to generate additional interest and understanding of technology deployment.

3. Technology/industry identity creation and awareness generation (logos and slogans) to help give a singular identity, purpose and synergy to deployment activities.

4. Information distribution and networking support creating a breakthrough, advertising-supported consumer friendly Web Site, to encourage feedback from stakeholders and as a clearing house of information.

5. Partnerships creation/brokering; and

6. Legislative initiative and actions to provide testimony on issues, and share potential direction with stakeholders to assist with action strategies.

Association: Revise the regional transportation model to reflect the effects of telecommunications

This topic is covered in a subsequent section of this report.

Association: Assess results of the Cluster, and revise the work plan accordingly.

An overview of the Strategy in operation is shown in **Exhibit 22**, Public-Private Process to Accelerate Telecommunications Deployment. An Analysis and Planning Process supports the agenda setting for the Advisory Group meetings within the Economic Partnership Process, which carries out actions that feed into the Market Process.

Exhibit 22:
Public-Private Process to Accelerate Telecommunications Deployment

Model City Starter Kits

Workshops & Outreach

Information Distribution & Networking

STRATEGIC MARKETING

SCEP TC

Identity Creation & Awareness

Brokering/ Partnerships Creation

Legislative Initiatives & Actions

MARKET PROCESS: Growth of telecom technology-based products and services

Market-driven development & deployment of telecom infrastructure & applications in the regional economy

More Regional use of telecommunications infrastructure & applications generally

Analysis & Planning Process The Association

Takes input of telecom applications from vendors and other sources

Screens applications for mobility impact logic

Establishes demonstration projects as needed

Analyzes applications to verify and quantify mobility impacts

Provides recommendations for Advisory Group attention

Determines new inputs to Transportation Planning process

Updates & Implementation of Regional Transportation Plan, RTIP, & AQMP

Emergence of mass market telecommunications applications

Causes of accelerated deployment

More Regional use of travel-saving applications

Resulting impact on travel demand in the Region

Resulting regional tele-com-travel

11. Financial Plan: Cost Elements

Flexibility is built into the design of this strategy, allowing either growth or shrinkage in the level of professional staffing and activity over time. The depth of implementation is a choice, now and continuing, based on priorities and budget available. The major cost elements of this work plan are as follows:

◆ Meetings of the Advisory Group.

◆ Management of the Telecommunications Cluster activity of the Partnership.

◆ Operation of the Association's telecommunications analysis function.

◆ Operation of the Web site.

◆ Intervention activities carried out by work groups and task teams.

◆ Special research projects.

◆ Outreach program of the Cluster.

◆ Outside Evaluative assessment three years period).

The fact that this Strategy is designed to work over a period of many years does not mean that shorter term results are unfeasible [11]. Any insights into barriers that are blocking the expansion of applications should be acted upon immediately. For example, suppose an analysis of the routine transmission of medical images between hospitals and clinics in Southern California turns out to be a significant travel saver. Suppose that a lack of a particular infrastructure or service offering is the clear blockage to expansion of this application. Then it would make sense for a working group to take steps to alleviate this problem.

12. Modeling telecommunications effects on transportation

Southern California Association of Governments, Southern California Economic Partnership, and California Department of Transportation seek to analyze telecommunications as a mode of transportation. This paradigm implies that the transactions, interactions, relationships, and information exchanges that are the purposes and result of physical movement in vehicles can sometimes be fulfilled through the use of telephoning, teleconferencing, computer network access, or other telecommunications.

To consider telecommunications as a mode of transportation, one must be able to map telecommunications events onto comparable transportation trips. Examples include:

◆ Instead of driving to work, a worker stays home and telecommutes.

◆ Instead of driving around to a variety of stores looking for a particular item to purchase, a shopper phones to a number of stores until the item is located, and then drives to one store directly.

◆ Instead of registering for university classes on the campus, a student registers over the telephone.

◆ Instead of going to church on Sunday, a family stays home and watches a popular minister on a televised religious service.

◆ Instead of driving to a video arcade at the mall, a teenager stays home and participates in an interactive game tournament that connects players nationwide over the Internet.

◆ Instead of a soft drink delivery truck driving to a heavily used Coke machine once every two days to fill it up (whether needed or not), wireless radio status reporting on the contents of the machine allow the bottler to visit as needed, which results in visits that calculate out to one visit every 3.3 days. (Actual application, numbers are hypothetical.)

One step in analyzing telecommunications as a mode of transportation is to list out the transaction, interactions, relationships, and information exchanges that can be fulfilled through either telecommunications or transportation. This means classifying by trip purpose those telecommunications applications with an impact on physical movement.

Another step in the analysis is to consider the degree to which the effect of telecommunications on physical movement is already built into the existing "four step" transportation models. Given that such models are calibrated to today's trip volumes, and given that the first incarnations of telecommunications (namely the telephone and TV broadcasting) have been acting on transportation in a serious manner for several decades (at least), a reasonable assumption is that telecommunications effects are implicitly built into transportation models, in that same sense that economic growth and land use patterns are built in. These effects would be measured through the periodic monitoring of travel characteristics in the region.

For example, consider the use of telecommunications as a substitute for meetings. One might assume that society is in the middle of a gradual evolution in the use of telecommunications as a way of meeting, an evolution that began with the growing use of telephones in the 1920s. Electronic mail came along later, and video-conferencing more recently. These technologies can perhaps be considered to be reaching use gradually enough to be fully encompassed in travel trend data that is used to create and calibrate present trip-generation models.

But gradual changes can work both ways. The overall conclusion of earlier research by Global Telematics is that there is a probability that there is no overall metro area trip reduction effect that telecommunications yields, in a natural, baseline sense, all forces considered. The list of ways in which telecommunications increases trip-making is just as long as the list of ways in which it decreases trip-making. *See Beyond Telecommuting*, [5] . Even for commuting trips, because of the prospect of other telecommunications applications besides telecommuting changing economic structure, business processes, and land use in the direction of more temporary employment, just-in-time behavior, and geographic dispersion, more SOV use is stimulated at the expense of ridesharing and transit.

The Association's present methodology of taking telecommuting and work at home as separate, outside, across-the-board overrides on the baseline trip generation stage of the model should be reconsidered in light this analysis. Given that the Association's traffic model is aimed at summariz-

ing all forces that bear on trip making, simply isolating the trip reduction side of telecommunications and applying it as a secondary override on the trip generation baseline is not valid. If the Association's baseline trip generation estimations are functions of volume drivers such as numbers of people, households, workers, and vehicles per household, then telecommunications usage that either increases trips or decreases trips is reflected in changing coefficients in the equations that would show up over time as the equations are calibrated to the real world.

Modeling the future effects of the Plan

While the overall effects of telecommunications deployment show up in the baseline model through the overall trip generation equations, we would propose a different focus for modeling the incremental, policy-driven telecommunications effects that result from this Plan. A main thrust of this Strategy is that for the region to achieve trip reduction from telecommunications the implementation process must identify those particular types of applications out of which reduction actually happens, understand these applications, and then take targeted policy and marketing action to accelerate their deployment. Promoting telecommuting is one example of a targeted action that would likely reduce trips through the use of telecommunications.

The Telecommunications Model City Starter Kit, telecommuting marketing newsletters from Metro, promoting particular applications through the Partnership Web site, and other extraordinary, intentionally-designed programs of action produce an incremental effect on telecommunications applications development and deployment. The expected incremental effects on telecommunications deployment and trip-making behavior from these initiatives would be the "delta" from the baseline. These efforts if successful must ultimately come down to incremental growth in the use of particular telecommunications applications that change trip making. This chain of logic then leads to the proposition that the effects of particular telecommunications applications on particular transportation trip types is at the heart of measuring how telecommunications and transportation are jointly modeled.

Indeed, measurement of the trip generation/conservation effects of the telecommuting application (home based work trip replacement) over the past decade provides an example of this approach. Telecommuting was carefully analyzed for trip effects for the first time in the California and Washington State Telecommuting Demonstration Projects. These efforts involved a defined set of telecommuters keeping travel diaries to measure both commuting behavior and other trip making. Control groups from the same employer organizations as the telecommuters also kept travel diaries. These results have been published, and are very optimistic for travel savings in the short run in that telecommuters do not generate commute trips on telecommuting days. Also, telecommuters and their families do not engage in other trip making that rolls back the savings. The only concerns that have arisen in the telecommuting studies relate to long-run land use patterns (telecommuters show a tendency to live in more dispersed locations) and in the manifestation of latent demand [12] as other drivers fill in for those commuters who stay home. These are not of concern in the trip generation stage of the four stage model.

Trip making for the purpose of shopping is probably the next most productive target for analysis of trip making, since shopping is the next biggest trip type after commuting. Mail order catalog shopping (which is really telephone shopping) is a reasonable initial surrogate for full electronic shopping. The travel behavior of a sample of heavy catalog shoppers should be compared to the trip making of a demographically matched sample of "mall crawlers." The trip substitution data generated in such a study could be generalized by mapping it onto projections of the expansion of electronic shopping.

This process of analyzing telecommunications impacts can be repeated for each trip purpose, for example, school trips, college trips, home-based other, and non-home based other. Actual trip purposes with a telecommunications equiva-

lent needs to be extracted from the last two. Every trip purpose and corresponding telecommunications application is somewhat different, although it is possible that applications and trip purposes can be grouped to simplify analysis. A general pattern would be to assemble a group of people who make some trips of a particular type, and/or who use a telecommunications application for the same trip purpose. Travel behavior would be differentiated by telecommunications usage. Examples of potentially useful analytical results include:

◆ Household that use on-line electronic grocery ordering make only r trips per week to grocery stores, compared to non users who make s trips per week. However, the delivery of groceries by trucks from the warehouse generates a trip equivalence of t trips per week that offsets the gain.

◆ Since University Alpha has begun offering classes via the Internet, the weekday daily level of campus parking lot entries per student has fallen from y to z, compared to University Beta where the similar figure has remained stable at n.

◆ Households owning a personal computer and using the Internet generate on average only xx% of the daily weekday trips that households not owning a personal computer do.

Analyzing the Knowledge Base

The Knowledge Base that is part of the Telecommunications Deployment Strategy described in this report is a starting point for analyzing travel effects of telecommunications. Measuring what telecommunications applications do to change travel behavior begins with determining the travel effect of particular case studies in the Knowledge Base through travel diaries or estimation. Then, the total travel effect of one sample application working across all six counties would be a matter of scaling up the effect of one case study across a proportion of the universe of possible application implementations that is reasonable.

For example, suppose a telephonic registration

system has been implemented at the UCLA main campus. Suppose that somehow, through travel diaries or through analytical estimation, a certain number of average trips per day are saved by this application, perhaps calculated by normalizing the effects of reduced quarterly registration home to campus trips across all days of the year. UCLA has, say, 30,000 students. The effect of this application being spread 100 percent across all campuses of all colleges and universities in the area is based on scaling up from 30,000 students on one campus to 120,000 students on 20 campuses. The mathematics is linear.

Suppose, for example, that the Telecommunications Cluster Advisory group with analytical help determines that this application is going to diffuse through market forces alone to only 60,000 students on 10 campuses. This becomes the baseline case for this application. The "Plan" case for this application is what would happen with a special incentive program from the Telecommunications Cluster. That would perhaps yield the 100 percent effect, with related travel benefits.

Measurement of the travel effects of telecommunications applications is thus an application-by-application effort that will take several years to complete. Eventually, with experience, economies in the process may appear in the form of generalizations about applications.

To summarize, the effect of applications is central to understanding how accelerated telecommunications deployment can effect trip-making. Even the long-run interest of Partnership and Association leadership in tracing the effect of telecommunications infrastructure deployment depends ultimately on understanding the trip-making impact of applications and working backwards into infrastructure.

13. Telecommunications and the Economy

Seeking positive impacts on the Southern California regional economy is a secondary mission of the Partnership. This is a secondary mission because it requires less targeting and focus than the primary mission of achieving travel impacts. Any effort to accelerate telecommunications deployment will have positive economic effects, so the primary particular focus on enhanced mobility and access of this Plan will certainly achieve such general effects. This section explains the range of mechanisms by which telecommunications affects any advanced economy.

Relationships between telecommunications and the economy

There are at least four relationships between telecommunications and the economy. Each of the relationships suggests a related economic development strategy for the region. Each potential economic development strategy can be folded into the Telecommunications Deployment Strategy.

First, telecommunications is provided by an important group of companies in the regional, national, and world economies. The industry of telecommunications service and equipment suppliers and related information technology companies is growing rapidly. These companies provide relatively high salaries and wages, but are not necessarily stable employers because of the turbulence in the industry common to high technology generally.

A regional economic development strategy that exploits this first relationship would be to foster attraction, retention, and growth in the region of telecommunications industry firms that have many employees.

To apply this economic development strategy within the strategy of telecommunications deployment for mobility and access enhancement, an emphasis would need to be placed on telecommunications deployment activity that favored the products and services of firms with relatively higher levels of local employment (actual or potential).

Second, the indirect but pervasive impact of application(s) and the use of telecommunications products improves the productivity, market reach, and other performance characteristics of all firms, including manufacturing, entertainment, wholesale, retail, financial, transportation, health care, education, and government. Information is an increasingly important input for the production of goods and services, and telecommunications provides the intra- and inter-regional highways for information flows. Telecommunications highways link all of the locations of enterprises, public services, and customers in the economy, and the performance of those highways --and how firms use these highways -- is critical to economic performance. Econometric analysis by Parker Telecommunications and DRI/McGraw Hill has shown that telecommunications investment in recent decades has caused economic growth[22] and productivity improvement[23] at the U.S. national level. Over the period 1963-91, the portion of total U.S. economy-wide productivity gains attributable to advances in telecommunications was 25 percent.

Providing incentives for the smart use of telecommunications by regional businesses and other organizations for the purposes of improving their efficiency, sales, productivity, export marketing, research capabilities or other aspects of performance is an economic development strategy. In response to Southern California's location in a zone of seismic activity, telecommunications also provides a means for economic functioning when the transportation system suddenly loses functionality as in the case of the 1994 Northridge earthquake.

To apply this strategy within the telecommunications deployment strategy, emphasis would need to be placed on particular applications projects that have a performance-enhancing effect on the organization involved, in addition to improving mobility. In fact, most organizations are interested only in mobility enhancements from telecommunications to the degree that the application also enhances organizational performance. In other words, this economic development strategy comes along for "free" with the rest of the telecommunications deployment strategy.

Third, new telecommunications applications cause qualitative and quantitative structural

changes in the economy that go beyond organizational impacts. Industry structure, types and numbers of jobs, entrepreneurial activity, and geographic activity location are all affected. The restructuring of the selling and distribution of goods through the growth of electronic commerce is one example.[24] The revolution that is occurring in adult training and education is another example.[25] More generally, the changing mixture of transportation and telecommunications in information exchange, transactions, relationships, and interactions is an example of structural change.

A related regional economic development strategy would be the promotion of telecommunications-enabled restructuring of the local economy, such as telecommuting, electronic commerce, and electronic service delivery. Such restructuring does not necessarily enhance mobility. A virtual office strategy with procedures that caused a mobile sales force to be driving during peak morning traffic is an example of reducing regional mobility even though the workers can stay personally productive using their cellular telephones.

To include a wider restructuring approach to economic development along with mobility enhancement would require choosing improvement activities that encompass wider restructuring effects. This would typically be the case in the widespread application of more daring and innovative approaches to mobility enhancement, such as restructuring consumer interaction with grocery stores into electronic ordering and home delivery. Another example would be an effort to restructure higher education around a much higher fraction of learning activity taking place at home or within walking distance of the workplace, so that fewer students drove to a traditional campus for their classes.

Finally, the purchase of telecommunications services and equipment by consumers is an important component of consumption. This consumption includes usage of telephones and computer modems, interactive services like Compuserve and America Online, and broadcast radio and television.

Promoting the consumption of telecommunications products and services by businesses and households when the purpose of that consumption yields a clear public benefit is a potential

regional economic development strategy. Beneficial uses of telecommunications include those that yield educational, business development, productivity improvement, and trip reduction purposes. Choice of promotional focus is necessary. Promoting telecommunications usage generally, which includes children playing interactive games instead of doing their homework, and adults engaged in telecommunications-enabled interactive wagering, is not clearly in the public interest.

The economic development strategy of promoting telecommunications consumption comes along automatically with almost any approach to mobility enhancement through telecommunications deployment. By definition, telecommunications deployment means increasing societal usage of voice, data, and video telecommunications.

Demand-side emphasis works best

While employment gains in the Southern California telecommunications industry (supply side) have been emphasized in strategic planning for the Telecommunications Cluster, it is certainly true that greater economic benefits to the region would come from the employment and income gains generated by the effective application and usage of telecommunications by organizations of all types and by individuals, not just from the production of telecommunications goods and services by the firms in one industry. For example in the 1994 Regional Transportation Plan, the forecast of 65,000 jobs to be created in telecommunications supply by the year 2010 from the activities of the Telecommunications Cluster is a trivial one half of one percent of the 12 million total jobs forecast to be located in the Southern California region during that same year. Furthermore, 65,000 telecommunications supply jobs is only two percent of the 3.1 million jobs to be added to the regional economy in the period 1990-2010. A plan that seeks to increase the mobility and telecommunications usage of the entire 2010 economy of 12 million jobs is more meaningful than adding 65,000 new jobs. This reasoning suggests that the demand-side effects of telecommunications on the economy — the second, third and fourth effects given above — should be emphasized in strategic activity over the supply-side effect described first.

Another reason for emphasizing demand-side effects rather than supply-side effects is the prospect that the restructuring of the telecommunications industry coming as a result of technological change and the Federal Telecommunications Act of 1996 will lead to massive layoffs in the traditional telecommunications industry. On January 2, 1996 for example, AT&T announced the coming elimination of 40,000 jobs, 13% of its workforce, over the next three years. An analyst quoted in Business Week[26] estimates an additional 60,000 traditional telecommunications jobs will be cut in the next five years, on top of the 250,000 cut since the Bell system breakup in 1984. These layoffs are a manifestation of "creative destruction"[27] that frees up resources for the founding and growth of new enterprises.

Job creation or job destruction

The AT&T layoff mentioned earlier raises the persistent question, do telecommunications and other information technologies destroy jobs faster than they are created? Or does information technology create more jobs than the supply of skilled people to fill them?

Two articulate policy analysts provide contrasting points of view:

Jeremy Rifkin, author of the book *The End of Work: The Decline of the Global Labor Force and the Dawn of the Post-Market Era*, has attracted national attention with a pessimistic view of the impact of technology deployment on job creation: "The global economy is in the midst of a transformation as significant as the Industrial Revolution. We are in the early stages of a shift from 'mass labor' to highly skilled 'elite labor,' accompanied by increasing automation in the production of goods and the delivery of services. Sophisticated computers, robots, telecommunications, and other Information Age technologies are replacing human beings in nearly every sector. Factory workers, secretaries, receptionists, clerical workers, sales clerks, bank tellers, telephone operators, librarians, wholesalers, and middle managers are just a few of the many occupations destined for virtual extinction. In the United States alone, as many as 90 million jobs in a labor force

of 124 million are potentially vulnerable to displacement by automation." Rifkin compares the past and the present like this: "In the past, when new technology increased productivity — such as in the 1920s when oil and electricity replaced coal- and steam-powered plants — American workers organized collectively to demand a shorter workweek and better pay and benefits. Today, employers are shortening not the workweek, but the workforce — effectively preventing millions of American workers from enjoying the benefits of the technology revolution."

Michael Rothschild, author of the book *Bionomics: Economy as Ecosystem* provides us with a contrary, more optimistic view: "You might ask whether anyone predicted the millions of new jobs that have been created worldwide by the personal computer industry over the last decade. The short answer is no. The explosion of growth caught economic forecasters by complete surprise....Imagining the future structure of an economy undergoing radical change is all but impossible. When George Washington took office, 97 percent of Americans were farmers. Today, fewer than 3 percent work the land. If an 18th century Jeremy Rifkin had asked President Washington to describe in detail the jobs that would absorb the talents of Americans about to be pushed off the land, could he have listed tractor mechanics, air traffic controllers and telephone installers?" Rothschild worries about an inadequate supply of skilled labor in the United States. He states, "We do not produce enough skilled young people to fill all the potential jobs technology creates. Were it not for a steady influx of technically trained immigrants, America's high-tech boom would be choked off. By their ability to create products and services that were previously impossible, technically skilled workers create jobs for others with lower skill levels. There is no inherent limit to job growth. If job opportunities expand too slowly, it will be because America has too few high skill workers spawning jobs for others."

Both Jeremy Rifkin and Michael Rothschild urge that the challenges of the Information Age become the subject of a critical national debate.

Based on evidence such as the two studies cited above from Cronin, et al, the consultant authors of this report are firmly on the side of the understanding that information technology — consider-

ing the demand side effects across all industries -- offers net job creation for the Southern California region.

With the job creation question settled, there is no need for the Partnership to choose which of three demand-side mechanisms noted above should be emphasized to bring economic benefits from telecommunications deployment to the Southern California region. It is certain that all three of the mechanisms -- organizational restructuring, industry restructuring, and consumer consumption will be working to create new jobs.

Distribution of Economic Benefits

Another issue about which the Partnership and the Association have been made keenly aware in Advisory Group discussion is the distribution of telecommunications benefits among people of different economic standing. It is increasingly common to hear leaders with a conscience worrying about the "haves" and "have nots" in the use of telecommunications and information services. Considerations of supply and demand then arise around this telecommunications issue as well. Equally important as the concept of "have/have not" (referring typically to availability and affordability of services to the economically disadvantaged) are the concepts of "can/cannot" which refers to knowledge and skill levels, and of "want/want not" which refers to interest and motivation. These latter two concepts are drivers of demand.

Any effective program of distributional equity in the development and deployment of telecommunications applications requires attention to these concepts as well as availability and affordability. That said, it is incumbent upon a public-private cooperative partnership like the Southern California Economic Partnership to address distributional equity in its efforts to accelerate telecommunications deployment. In the format of the Knowledge Base, there is a data field for describing how the application differs in its market acceptance across economically advantaged and economically disadvantaged people, and whether there is a public interest in promoting access and use of the application by economically disadvantaged people.

Indicators

The economic impacts of implementing the Telecommunications Deployment Strategy should be assessed through multiple measurements that capture direct specific effects as well as broad general effects.

Specific telecommunications indicators capture direct effects of strategic intervention that attempt to change patterns of telecommunications production or usage.

◆ telecommunications service and equipment purchase and usage trends in the region and in the various subregions

◆ telecommunications consumption per capita in the region and in the various subregions

◆ telecommunications cost relative to other regions

◆ representation of Southern California firms on independently-generated lists of firms rated for best telecommunications usage

◆ size and strength of the regional telecommunications industry sector, including number of new jobs created.

General economic indicators capture broad effects that lie downstream from changed patterns of telecommunications usage. However, the broad effects described here are the result of multiple factors, not just telecommunications.

◆ regional economic output

◆ regional productivity

◆ per capita personal income in the region

◆ distribution of personal income in the region

◆ regional employment levels

◆ export performance of the region

◆ travel consumption per capita in the region

Conclusion

The Telecommunications Deployment Strategy provides a new, additional focus and motivation for the private and public efforts that are already deploying telecommunications in Southern California. The focus described here is justified because of the extraordinary magnitude of the mobility and air quality problems in the region.

At the same time, the telecommunications infrastructure, services, and applications that are deploying in the six counties of the region are nested within a National Information Infrastructure and a Global Information Infrastructure that along with transportation is a key mechanism for letting California perform competitively and successfully as part of the global economy.

The Association and the Partnership are convinced that the specific mobility enhancement focus of this plan indirectly yields the additional economic benefits of job creation, organizational productivity, and enhanced competitive performance by regional firms in addition to the travel-saving benefits that are sought directly.

The Telecommunications Deployment Strategy, if executed flexibly in response to changing environmental conditions, will establish Southern California's worldwide leadership in the application of telecommunications for mobility and access enhancement, while at the same time contributing to economic competitiveness, increasing service delivery efficiency, and improving quality of life.

References and Notes

1. Southern California Association of Governments, Regional Mobility Element: The Long Range Transportation Plan for the SCAG Region, Volume 1, June 1994, page 1-1.

2. In Volume 2, Appendix G of the Regional Mobility Element cited in note 1, telecommunications is defined as "the conveyance of information by electronic means. Examples include the telephone, interactive cable facilities, computer networks and video conference centers." (page G-10) We have enhanced this definition by recognizing interactive (real-time, two-way) communications, by noting the optical part of the electromagnetic spectrum, and by stressing communications beyond easy consumer walking distance where vehicle travel begins to be the leading alternative to telecommunications.

3. This model benefits from consideration of the Integrative Technology Model, prepared by the Vicki Suter at the Davis Community Network. See the DCN/Smart Communities Project Description, provided in Appendix C.

4. Reports examined include California Public Utility Commission, Enhancing California's Competitive Strength: A Strategy for Telecommunications Infrastructure, November 1993; California Council on Science and Technology, Project California: A Blueprint for Energizing California's Economic Recovery, October 1993; The Governor's Council on Information Technology, Getting Results, March 1995; City of Los Angeles Special Advisory Committee on Technology Implementation, Final Report, January 1995; Joint Venture: Silicon Valley Network, The Joint Venture Way: Lessons for Regional Rejuvenation, 1995; Institute for Local Self Government (Sacramento), A Telecommunications Framework, November 1991; The National Information Infrastructure Advisory Council, Common Ground: Fundamental Principles for the National Information Infrastructure, March 1995; United States Department of Transportation, Transportation Implications of Telecommuting, April 1993; and United States Department of Energy, Energy, Emissions, and Social Consequences of Telecommuting, June 1994.

5. United States Department of Energy, Beyond Telecommuting: A New Paradigm for the Effect of Telecommunications on Travel, September 1994.

6. Joel Garreau, Edge City: Life on the New Frontier, Doubleday, 1991.

7. Center for the New West et al, WorkSmart Final Report, July 1995.

8. WorkSmart Final Report.

9. Doug Bartholomew, The Longest Day, Information Week, September 19, 1994, pp. 35-44.

10. On the Internet at http://www.ci.san-carlos.ca.us/telecom/lccmod.html.

11. For further explanation of biology references in the 2010-2015 era, see Kevin Kelly, Out of Control: The New Biology of Machines, Social Systems and the Economic World, Addison-Wesley, 1994; Stan Davis and Bill Davidson, 2020 Vision, Simon & Schuster, 1991; and Gregory Benford, "Biology 2001," Reason, November 1995, pages 22-29.

12. Anthony Downs, Stuck in Traffic, The Brookings Institution, 1992.

13. Office of Technology Assessment, Congress of the United States, The Technological Reshaping of Metropolitan America, September 1995.

14. California Department of Transportation, Advanced Transportation Systems Program Plan, October 1995.

15. Beyond Telecommuting

16. Energy, Emissions, and Social Consequences of Telecommuting, page xvii.

17. Southern California Telecommuting Partnership, Telecommuting Services Regional Needs Assessment for the Southern California Region, February 16, 1995, page 7.

18. "Retailers want shoppers back," United Press International wire, April 22, 1994; Patrick L. Phillips, "Merging entertainment and retailing," Economic Development Review, v13n2, Spring 1995, pages 13-15.

19. "Reinventing the Store," Business Week, November 27, 1995, page 85.

20. "Interactive Shopping," The Forrester Report, May, 1994.

21. "The Future of Electronic Shopping," Wired, January 96, p. 64.

22. Francis J. Cronin, Edwin B. Parker, Elisabeth K. Colleran, and Mark A. Gold, "Telecommunications infrastructure and economic growth," Telecommunications Policy, December 1991, pages 529-35.

23. Francis J. Cronin, Edwin B. Parker, Elisabeth K. Colleran, and Mark A. Gold, "Telecommunications infrastructure investment and economic development," Telecommunications Policy, August 1993, pp. 415-30

24. Robert L. Segal, "The Coming Electronic Commerce (R)Evolution," Planning, Nov-Dec 1995, pp. 21-27ff.

25. Lewis J. Perlman, School's Out: Hyperlearning, the new technology, and the end of education, William Morrow and Company, New York, 1992.

26. "The Bloodletting at AT&T is Just the Beginning," Business Week, January 15, 1996, page 30.

27. This phrase was popularized by economist Joseph Schumpeter in reference to the continuing dynamic of old business organizations dying under the pressure of competition from newly created firms.

Glossary

Travel: The physical movement of people or material from one location to another using transportation.

Transportation: The means of physical movement of people and material, for example, the system of public roads and private and public vehicles.

Mode of transportation: The type of medium used to travel (example: vehicles).

Mobility: The ability to move people or material from one location to another. Transportation provides mobility.

Telecommunications: Interactive communications and other conveyance of information over a distance by electronic and optical means

Access: The ability of people to communicate with or travel to a distant location. Transportation and telecommunications both provide access.

Physical Accessibility: The ability or ease of all people to travel among various origins and destinations.

Electronic Accessibility: The ability or ease of all people to use telecommunications to connect with various distant locations.

Telecommunications Infrastructure: Cables, antennas, switches and other physical facilities that permit telecommunications.

Telecommunications Application: The deployment and use by one or more organizations of networks, hardware, software, and telecommunications services to carry out an organizational purpose such as service delivery to customers, or support of employees in dispersed locations. Examples of telecommunications applications are telecommuting, telemarketing, community networking.

Telecommunications Deployment: The increasing societal usage of telecommunications.

Telework: Any use of telecommunications that changes the location of workers or facilitates their mobility.

Telecommuting: Using the telephone, computer networks, and other telecommunications to work at home or at telework centers, instead of commuting. Telecommuting is a particular type of telework.

Teleservice: Any use of telecommunications to make service available to customers in a non-traditional location through electronic access.

Telelogistics: Any use of telecommunications that modifies the transportation of freight and other material.

APPENDICES

APPENDIX A
The Los Angeles County Telecommuting Outreach Project

The Los Angeles County Telecommuting Outreach Project was an adjunct activity to the development of the Telecommunications Deployment Strategy for the Southern California region. As a subcontractor to the Southern California Association of Governments (SCAG), the Los Angeles County Metropolitan Transportation Authority was responsible for design and implementation of the project.

Background

The Los Angeles County Metropolitan Transportation Authority (MTA) first proposed a county-wide telecommuting outreach project in the Fall of 1993. The original proposal grew out of a perceived need to increase awareness of and dispel myths about telecommuting at the highest levels of Los Angeles County business. Initial discussions and conceptual planning began when MTA staff approached Pacific Bell about a joint effort to conduct a regional telecommuting outreach series to CEOs and middle managers. The working title was "The Telesociety Project." Although all involved in the discussions were supportive of the idea, funding remained a problem.

Following the Northridge earthquake in January, 1994, interest in telecommuting increased dramatically. Federal Emergency Management Agency (FEMA) funds were available to the MTA to help alleviate congestion in transportation corridors affected by collapsed freeway bridges. Simultaneously, the City of Los Angeles was the recipient of $1.5 million in Economic Development Administration - Commerce Department grant funds to conduct an emergency program to support telecommuting in the five county region of Los Angeles, Orange, San Bernardino, Riverside, and Ventura counties. As a result, MTA did not apply for FEMA emergency funds.

At the same time, the Caltrans Office of Traffic Improvement, realigned existing projects in the region and allocated some new funding from FY 1993-94 to assist Southern California with telecommunications-based transportation pro-

jects designed to help recover from the earthquake. Since there was still a need for outreach, MTA asked to Caltrans for funding of a telecommuting outreach program to compliment work initiated by the City of Los Angeles and others.

In response to MTA's request Caltrans recommended that the telecommuting outreach program be added to the work plan of the Southern California Association of Governments to form the Telecommunications Cluster of the Southern California Economic Partnership and to develop the Telecommunications Deployment Strategy for the region. Caltrans staff suggested a two-phase approach to the project. Phase One would be a design and pilot testing of the effectiveness of the message within Los Angeles County. Upon successful completion of Phase One, other regional transportation commissions would be invited to apply for new Caltrans funding to conduct a full blown outreach in their respective counties.

Following approval of the contract for Phase One, Caltrans determined the state required nearly one billion dollars to conduct a massive seismic upgrade of state freeway bridges and other structures. This delayed final execution of the contract with SCAG into the late fall of 1994. At that time, it became clear that Caltrans funding for the Phase Two outreach program would not be available

Based upon these funding realities, and after consultation with both the staff of SCAG and Caltrans, MTA staff proposed redesigning the outreach project to be a modest but actual outreach program to Los Angeles County businesses. Based upon this agreement, the MTA program was redesigned to move forward as a component of the Southern California Economic Partnership - Telecommunications Cluster: the principal subject of the grant agreement between Caltrans and SCAG. Thus, the MTA county-wide telecommuting outreach project has moved forward as a response to the Northridge earthquake and an adjunct activity of the formation of the Telecommunications Cluster of the Southern California Economic Partnership and the development of the Telecommunications Deployment Strategy.

Description of The Outreach Project

The Los Angeles County Telecommuting Outreach Project had three components:

- •NEWSLETTERS
- •SEMINARS
- •TELECOMMUTING HOW-TO MANUAL

These components were designed to coordinate with other Caltrans funded projects such as the WorkSmart Project and with the activities of the Southern California Telecommuting Partnership - the City of Los Angeles sponsored telecommuting project.

OVERVIEW

Both 1990 census data and the Regional Needs Assessment conducted by the Southern California Telecommuting Partnership show that telecommuting is more prevalent in small business organizations than in large business organizations. Seventeen percent of employees in companies with less than 100 employees per worksite have telecommuting available to them as a work option. In contrast, only ten percent of employees working for companies with 100 or more employees per worksite have telecommuting available.

Numerous other studies of telecommuting pilot projects have documented that smaller companies have greater levels of trust between managers and employees which is a key success factor in telecommuting program implementation. Larger, more institutionalized business organizations, tend to be moribund in hierarchial business structures, and subject to organization-wide resistance to rapid change. These characteristics of larger organizations make the development and implementation of a telecommuting program more difficult than smaller, nimble business organizations. This data suggested the need to outreach to large businesses.

Additionally, past conferences and seminars sponsored by government agencies have tended to focus upon the societal benefits of telecommuting (e.g., mobility, clean air, energy consump-

tion). While these issues are of great concern to government agencies, they are not the central focus of business organizations. Both the newsletters and seminars focused upon primary business benefits important to an organization's bottom line: cost reduction, productivity, global competition, and changing concepts of workplace. Secondary societal benefits and compliance with governmental regulation were de-emphasized or omitted for this audience.

Based in part on this data and pilot program study results, the Los Angeles County Telecommuting Outreach Program was designed to:

- •Increase awareness of telecommuting and other alternative workplace strategies
- • Make the case for telecommuting based upon good business sense rather than air quality and traffic congestion governmental regulation
- •Dispel commonly held myths about what telecommuting is and is not
- •Provide real examples of successes in other Southern Californian businesses
- •Point the project target audiences to resources and telecommuting implementation assistance available in Los Angeles County
- •Provide an opportunity for interested target audience members to meet and learn more about topics of professional interest in the telecommuting area
- •Provide a new step-by-step telecommuting manual for Southern California

Thus, for its modest budget, the project provided a short-term stimulation of interest in telecommuting for some of Los Angeles County's largest employers with information-based employees.

THE TARGET AUDIENCE

Large Business Organizations

Large business organizations were the target audience. These were defined as business organizations with over 100 employees reporting to the worksite. MTA staff obtained a copy of the latest Regulation 15 (employee commute options program for the South Coast Air district) database

from the South Coast Air Quality Management District (SCAQMD). The database included about 5,000 large employers within air district boundaries. Staff deleted from the data base all employers sited outside the County of Los Angeles. Next staff reviewed the remaining list of firms and deleted businesses judged to be largely involved in manufacturing or other non-information oriented business sectors. The resulting mailing list of large, information-based Los Angeles County employers totaled 1,850 firms.

Key Positions Within Large Business Organizations

Studies and anecdotal evidence both support the proposition that the success of any business organizational change depends upon the individuals holding key decision making positions within a company. Although many key positions may exist within businesses, project resource limitations required that the outreach effort be targeted to four (4) key positions within the large employers of Los Angeles County: the Chief Executive Officer (CEO), the Human Resources Director, the Information Systems Director, and the Facilities/Real Estate Director of each company targeted. MTA staff then reviewed the large employer mailing list and created four separate mailing lists -- one for each of the targeted key positions. Thus, the project target audience was the CEO, Human Resource, Information System, and Facilities/Real Estate positions within 1,850 of Los Angeles County's large, information-based employers.

THE NEWSLETTERS

The name of the newsletter for all target audiences was "The Workplace Wire." Four different mastheads were designed for the four target audiences. Because the project was of a limited duration and budget, three series of newsletters to each of the four target audiences, for a total of twelve newsletters were produced. Copies of all twelve newsletters are located at the end of this appendix. MTA staff determined that each newsletter series would focus on a general subject matter, but each newsletter would be written from the perspective of the target audience.

The general subject matter of each newsletter series was:

First Series: Changing nature of work and workplace, global competition and other external factors that impact business organizations today

Second Series: Issues surrounding the development of a telecommuting program

Third Series: Issues surrounding implementation and maintenance of a telecommuting program

The principal sections of each newsletter was:

First Series: Why You Are Getting This Newsletter

Main Article(s) on Topic of Interest to Target Audience

Resources

Second Series: Main Article(s) on Topic of Interest to Target Audience

Description of Upcoming Seminar

Resources

Third Series: Main Article(s) on Topic of Interest to Target Audience

Seminar Information

Resources

Evaluation Survey Form

All newsletters had a masthead and publication box.

MTA staff recruited experts in telecommuting, technology, and business to guest-write most of the newsletter articles. MTA staff wrote the balance of the articles, seminar, and resource sections.

SEMINARS

The professional seminars were intended to provide an opportunity for interested target audience members to get more in-depth information about telecommuting and alternative workplace strate-

gies. Rather than simply have the MTA or SCAG sponsor a seminar for each of the target audiences, MTA staff attempted to involve or obtain co-sponsorship of the seminar series by appropriate professional organizations. The underlying philosophy of this strategy was that the professional organizations could help promote and provide credibility with members of each target audience of the project.

The Chief Executive Officer Seminar

The time available to the project staff did not allow full implementation of the CEO event during the contract period. Instead staff expended efforts to recruit co-sponsors and initiate the planning process for the CEO event. As of the date of this report, staff has obtained commitments from the Los Angeles Chamber of Commerce, the Los Angeles Economic Development Corporation, and the Los Angeles Regional Technology Alliance as potential co-sponsoring professional organizations. Additionally, staff has obtained a $2,000 commitment of funding for food and drink from GTE and Steelcase has expressed very strong interest in providing additional financial support for the event. During the final month of the contract, staff did work with representatives of the co-sponsoring organizations and financial sponsors to identify a date, time, location, meeting agenda, and program content.

The Human Resources Professional Seminar

The Human Resources seminar was held on May 21, 1996, at the Pacific Design Center Conference Center in the City of West Hollywood. The seminar was co-sponsored by the Association for Commuter Transportation (ACT) after the Professionals in Human Resources organization declined to participate. The promotion for the event included the mailing of invitations to the entire Human Resources newsletter mailing list, mailing of approximately 950 invitations to the ACT mailing list, and a literature table/presentation at the annual ACT conference in April, 1996. Staff was unable to recruit a corporate sponsor to pay for the food and drink served as part of the working luncheon. Attendance at the event was somewhat disappointing with approximately 16 participants appearing despite advance RSVPs totaling 37.

Staff began the seminar with a presentation of telecommuting and alternative office concepts, and common problems associated with organizational change. Following the introductory lecture, the groups at each table were asked to review a case study problem involving a fictional corporation named Gamma Corporation. Through group discussion and interaction conducted while the participants ate lunch, each table produced answers to four questions concerning the case study problem. Sandra Taylor, a Human Resources Director with the Los Angeles County was a featured speaker. She commented on some of the solutions offered in the group table reports and shared additional observations based upon her agency's own telecommuting program. After the case study, staff reviewed regional resources available to participants in developing their own programs. A literature table with Workplace Wire Newsletters, books, videos, manuals, disaster preparedness/recovery materials and promotional materials of the Southern California Telecommuting Partnership were available to participants for pick-up or review.

The Information Manager Seminar

The working breakfast seminar for Information Systems professionals was conducted on May 29, 1996 in the Steelcase showroom at the Pacific Design Center in the City of West Hollywood. The event was co-sponsored by Steelcase and Microsoft. Promotion for the event included sending invitations to the mailing list for the Workplace Wire, promotion by regional representatives of Steelcase and Microsoft, and presentations to two professional events. Despite 33 RSVPs, attendance at the event was 19.

Staff began the program with a lecture/presentation similar to the Human Resources seminar while participants ate a light breakfast provided by Steelcase. Kurt Shintaku of Microsoft Corporation was a featured speaker on secured access, information security, and use of Internet for telecommuting. Next staff presented the case study problem and each table discussed another problem based upon the fictitious Gamma Corporation. After the table discussion leaders presented their answers to the problems, staff conducted a review of additional resources available for those participants interested in develop-

ing telecommuting programs. After the end of the seminar, some participants toured the Steelcase showroom to see the latest designs of alternative officing furniture.

The Facilities Manager Seminar

The working luncheon seminar for Facilities Managers and Real Estate Professionals was held on March 14, 1996, in the Conference Center of the Pacific Design Center. In contrast to the other seminars, the Facility Manager seminar was conducted as part of the Westweek Conference -- an annual conference attended by thousands of architects, designers, and facility managers. The seminar was co-sponsored by the International Facility Managers Association (IFMA) and the Pacific Design Center. Promotion included special mailings to local chapters of IFMA and presentations at several professional events in the region prior to the seminar. The luncheon was sponsored by a number of furniture vendors recruited by the staff of the Pacific Design Center. With RSVPs totaling 76, the event was attended by over 60 people.

Again the program began with staff presenting a lecture/presentation on telecommuting and alternative officing and organizational change. Carol Efaw Real Estate Portfolio Manager of Xerox Corporation gave a brief presentation concerning the challenges of implementing a large virtual office/hotel operation. While the participants were eating a light buffet lunch, each table discussed and answered a number of questions concerning a case study based upon Xerox. Each of the tables reported their recommendations regarding facility leasing and Xerox staff commented upon the solutions. Remarkably, one discussion group came very close to the recommendation actually implemented in Southern California by Xerox. Next the Chief Financial Officer of Xerox, Ed Zelinske, outlined how Xerox implemented an alternative office strategy in Southern California. Finally staff pointed out the numerous resources available to participants working on telecommuting and alternative office programs in their own companies.

Telecommuting How-To Manual

Since the Caltrans state wide How-To-Manual, 1992, no comprehensive telecommuting manual

has been available in Southern California. Rather than use scarce resources to write a new manual from scratch, MTA staff negotiated permission to reprint the Washington State Energy Office telecommuting manual which was judged to be the "state-of-the-art." MTA Graphics staff created a new manual cover with all the logos of the participating government agencies. Although substantial portions of the manual were reproduced without changes, staff revised some materials to update the manual and provide some examples from Southern California rather than the State of Washington.

The manuals will be sold at a price designed to recover royalty paid to the Washington State Energy Office at $10 per manual.

Project Coordination Activities

Under the terms of the cooperative agreement between Caltrans and SCAG, the Telecommunications Cluster and related projects were to be coordinated with other Caltrans sponsored projects in the region and with the activities of the Southern California Telecommuting Partnership (SCTP). There were many activities under the County-wide Telecommuting Outreach Project that were carefully coordinated:

- WorkSmart Project - The WorkSmart Project was prominently featured in the first issue of the Workplace Wire sent to Information System and to Facility Manager professionals. Additionally, in several of the AResources@ sections of the newsletters, readers were directed to the WorkSmart Project team for more information or a copy of the final report

- Worksmart at the Telecommunications Cluster - The project director for the Worksmart project also gave presentations to the Telecommunications Cluster at one meeting.

- Recruitment of Writers - MTA staff recruited a number of regional and national experts in telecommuting to author the articles that appeared in the Workplace Wire. Authors included Jack Nilles, the Afather of telecommuting,@ Elham Shirazi, project manager for the

consultant team working on the SCTP, Carol Nolan, consultant working on the Blue Line TeleVillage, Gil Gordon, a nationally recognized expert in telecommuting, Evelyn Gutierrez, the SCTP representative to the SCEP-Telecommunications Cluster, and John Cox, president of the SCEP-Telecommunications Cluster. Many of these experts are now or were involved in numerous Caltrans-sponsored projects in the region.

- SCAQMD Mailing List - The Workplace Wire mailing list was developed from the SCAQMD Regulation 15 list. The SCAQMD graciously waived the normal charges for the provision of the database to the Telecommuting Outreach Project.

- SCTP Representative on the Cluster - The SCTP was linked to the Telecommunications Cluster project though its representative who sat in on the Cluster meetings.

- SCTP Meetings - MTA staff accompanied SCAG staff to all public meetings of the SCTP. Staff actively participated in formulating the SCTP Needs Assessment, Work Plan, and consultant RFPs. At SCTP meetings, staff gave SCTP board members progress reports on the Telecommunications Cluster and Telecommuting Outreach efforts.

- Telecommute America - During the planning process for Telecommute America (October 1995), the MTA staff worked with the Telecommuting Advisory Council to develop a telecommuting pledge program. MTA staff worked to provide the SCTP marketing and training consultants with 30 Ahot leads@ of companies pledging to try to develop telecommuting programs in the coming year.

- SCTP Consultant Team Briefings - MTA staff provided the SCTP consultants with a substantial amount of initial assistance in understanding key telecommuting issues. MTA staff shared a significant amount of materials from MTA files to assist the SCTP in developing its own educational materials.

- SCTP in the Workplace Wire - The SCTP and its (800) number were prominently featured in numerous Resources sections of two thirds of

the Workplace Wire. Additionally, the consultant for the SCTP project manager wrote the substantive article for the second CEO Workplace Wire newsletter.

- SCTP in the Professional Seminars - Representatives of the SCTP were invited and attended each of the three professional seminars conducted by the MTA. At the seminar, the SCTP displayed its collateral materials on disaster preparedness/recovery, spoke about the services available, and networked with seminar attendees as additional Ahot leads@ for follow-up marketing activities.

- Manual Promotion - The SCTP is helping the MTA promote sales of the new telecommuting implementation manual. The SCTP has included a flyer about the new manual in its promotional folders and its staff of trainers will make companies aware of the availability of the telecommuting manual. SCAG helped promote the manual at its General Assembly at the Riverside Convention Center.

Thus, the County-wide Telecommuting Outreach program was integrated to the greatest extent possible with relevant Caltrans-sponsored projects and the SCTP.

DISASTER RESPONSE AND PREPAREDNESS

The funding of the County-wide Telecommuting Outreach was, in part, a Caltrans response to the Northridge earthquake.The SCTP work plan included the preparation of a specific educational piece on telecommuting and disaster preparedness/recovery.

Disaster preparedness was one of the specific advantages cited to the target audience in several publications and in some of the seminars, however, it was acknowledged that most business organizations adopt telecommuting for reasons other than simply disaster preparedness. The SCTP publication was highlighted and distributed to a number of participants of the seminars.

LESSONS LEARNED

Inherently, education and outreach projects such as this project are difficult to assess in terms of

effectiveness. The adoption of new ideas and the organizational changes represented by this program is an incremental process rather than one of immediacy. Nonetheless, a modest effort of evaluation was built into the project. An evaluation survey form was included in the third series of the Workplace Wire newsletters sent to the entire project target audience. Recipients were requested to complete the evaluation and fax the form to the MTA staff. Unfortunately, not enough responses were received for evaluation. Evaluation surveys were also distributed to the participants of the Human Resources and Information Managers seminars. Overall participants rated the seminars above average. Some commenters wanted more information about how to sell the telecommuting concept to upper management and others felt the seminar should have been longer to cover more information in-depth. Many participants found the factually-based, interactive case study discussions with colleagues to be very thought provoking and educational.

Based upon experience gained through the implementation of this outreach project, MTA staff would make the following observations regarding lessons learned:

1. Telecommunications Educational Programs Are Vital to the Region. MTA staff believes that a very appropriate role for government in a rapidly changing telecommunications/ computing marketplace is one of cheerleader. Although technology is evolving very rapidly, people and society's institutions are not. Outreach programs that put knowledge about how to change, how to better use technology, how to better understand the likely future impacts of technology are essential to maintaining and developing a population ready to meet the new challenges ahead -- economic, social, and institutional. Unlike a project to convert diesel engines to CNG, the transportation and air quality benefits are difficult to measure and quantify in such educational programs. This, however, should not deter sustained and adequate levels of funding for such educational programs.

2. Government Subsidies Support The Success of Private Sector Deployment. The benefits of using telecommunications to significantly reduce operating costs, increase productivity, and enhance quality are incentives for business organizations to adopt such technology. The risks to the business organization in changing to adapt to new technologies are so low, and education programs support accomplishing this goal in the telecommuting and alternative officing area.

3. Paper-based Educational Products Are A Necessary Component. Educational products such as The Workplace Wire Newsletter and the telecommuting implementation manual produced as part of this project continue to be a necessary component of any educational program directed at increasing regional adoption of telecommunications. While making work products available over Internet, CD ROM, and other distribution media are also important, the target audience for these programs are people who still receive the bulk of their business information via the printed word.

4. Plan Training/Outreach for Key Conferences and Organizations. As the attendance at the Workplace Wire Seminars clearly demonstrated, integration of training/outreach activities into the professional development, conferences, and agendas of professional organizations is essential to assure access to target audiences. The Facilities Manager seminar conducted as part of the Westweek conference was attended by over 60 major Los Angeles County corporations, however, the seminars co-sponsored and held independently of professional organizations were only modestly attended. A sustained effort by an appropriate regional entity to offer courses and training as part of annual conferences/meetings is key.

5. Publicize Successful Applications of Telecommuting. Successful applications of telecommuting and alternative office techniques should be publicized along with every other activity in the region's Telecommunications Deployment Strategy. This could include the Knowledge Base or similar information dissemination programs or regional award programs patterned after the successful National Information Infrastructure Awards.

Conclusion

The Los Angeles County Telecommuting Outreach Program is a modest program designed to touch 1,850 large, information-based Los Angeles employers at four key positions in an effort to increase interest in trying telecommuting and other new workplace alternatives. Through a series of newsletters, seminars co-sponsored with professional organizations, and a comprehensive telecommuting how-to manual, the MTA, as part of the Telecommunications Cluster project of SCAG, will seek to increase adoption of telecommuting within Los Angeles County.

II The Los Angeles County Telecommuting Outreach Program Manual
Telecommuting: A Formula for Success
"Step-by Step Guide for using Telecommuting to meet the Needs of Your Business"

"Before the invention of factories and large offices, most people worked in their homes or pretty near them. The Industrial Revolution dragged them away — first to the dark satanic mills of manufacturing, then to the paper-filled prisons of commerce and the service industries. Can the telephone and the computer bring workers back home again?" *The Economist*

Your business organization may not be a "dark satanic mill" or "paper-filled prison" as painted by The Economist, but there is no denying that more and more businesses and their employees are discovering the many ways in which telecommuting and related alternative office strategies can confer tremendous tangible and intangible benefits upon the organization and its employees.

This chapter describes how telecommuting and related alternative office strategies can help meet real business needs of your organization. It also provides you with practical information in making the business case for telecommuting/alternative officing in your own business organization.

The Big Picture

Business executives and public officials are currently facing the realities of a fundamental change in the nation's, indeed the world's, economy. In countless ways and every day, we are witnesses to a transformation of our economy to one of information and services. The magnitude of these societal changes will fundamentally change the ways in which we live and work.

The changes inflicted upon human kind by the shift from the Agricultural Age to the Industrial Age were equally dramatic. As a result of the invention of new technologies that significantly drove down the costs of production, an economy based upon small, individual crafts and businesses was swept from the countryside and villages into urban settings. The new technologies and new economic realities of the era transformed human work and living patterns. The family, the community, the government, the church — all were broken apart and reassembled in accordance with the Industrial Age paradigm. The

Agricultural paradigm for the nation's economy was forever gone.

Today, evidence of another tremendous paradigm shift is undeniable. Dislocated workers and tremendous workplace uncertainty dominate the headlines and public opinion polls. Numerous Industrial Age inventions like the steam engine and the assembly line drove the adoption of the Industrial Age paradigm. Today, inventions such as the transistor, desktop computer, fiber optic cable, and wireless modem are driving the dismantling of the Industrial Age model and the building of a new Information Age paradigm. Business organizations that step back from their day-to-day business to think about the implications of these changes are best equipped to grapple with how the changing economy will affect them. Those who do not heed the warning signs of change do so at their own peril.

Telecommuting — Part of the Information Age Paradigm

The Information Age Paradigm includes telecommuting and the use of alternative office strategies. Today, companies are struggling to cut costs, increase productivity, and maintain profitability. In a trend that has implications for the real estate industry — some companies are beginning to question the need for a huge central office. What better symbol of the Industrial Age is the factory or the "paper-filled prisons" of commerce ? Is 120 square feet of office space per worker a sacred work place principle? Does work in the Information Age require a 25 minute or longer commute to that assigned 120 square feet on the 23rd floor of a central office? Many companies are quietly questioning these formerly unassailable principles of the Industrial Age model of the workplace.

For those companies who thoughtfully experiment with new concepts involving the use of a distributed work force, the rewards can be high. For instance, IBM undertook a virtual office program in the early 1990s. Nationwide, over 20,000 IBM employees are telecommuters. Most of these employees are sales and service staff who build

greater customer satisfaction by being in the field with customers rather than sitting at a desk in the central office. Employees feel empowered to do their best for customers, managers have noted increased productivity and customer satisfaction, and IBM has realized tens of millions of dollars of real estate cost savings by reducing central office sizes.

Other companies have looked seriously at how real business needs of the company — increased time with customers, decreased operating costs, enhanced corporate image as cutting-edge, development of a family friendly work place — can be addressed through the effective use of distributed work force and telecommuting. Most of these companies do not want to disclose their experience with telecommuting to others — it becomes part of their long range business plan and a competitive edge. Exact dollar savings are hard to obtain from companies, but anecdotal evidence suggests it is not trivial.

The Challenges and Rewards

The challenges presented by the disruption and transition to the Information Age are difficult for the social institutions, the individual, and society in general. Let's look at some of the challenges and how telecommuting may address the challenges.

The Business Organization

Business organizations in an information economy are faced with some daunting challenges. As indicated above, business organizations must respond to the shifting economy or risk rapid loss of profitability. Businesses must find ways to recruit and retain the best employees and expand their ability to hire a diverse work force including the disabled, part-time, and semi-retired. Additionally, businesses are responding to employee requests for family-friendly work place initiatives.

More and more business organizations are willing to turn to telecommuting and alternate office strategies as a way to start down the road to fundamental organizational change — change that, among other things, brings better productivity, happier customers, re-energized employees, and a healthy bottom line.

The Individual

Employees are seriously affected by the shift to the Information Age. In Southern California, the pursuit of home ownership is more elusive for many families. Even with two working parents or a single parent in the home, many families have moved to ever remote areas of the region in order to finding affordable housing. Increasing responsibilities at work, decreasing job security, and lengthening commutes all add to daily stress. These employees must find time to do their job and meet family responsibilities. Many workers are asking for more flexibility and autonomy in the workplace in order to achieve a better work-family balance.

Employees placed in telecommuting or virtual office programs have reported greater productivity and morale. Supervisors of telecommuters report that they are better at measuring performance because telecommuting encourages them to focus on the quality of their employees' work rather than on their attendance or work process. Much of today's management philosophy is still rooted in the Industrial Age idea that if an employee does not report to the factory and put in time, the employee is not working. However, the productivity of many employees who work with information is apt to be measured by quality as much as quantity, and to do their jobs well, they often need more autonomy and time to think. Telecommuting can help meet these needs, and can result in enhanced job performance and increased job satisfaction.

The Society

Our automobile-intensive transportation system has generated several challenges for our society, including traffic congestion, air pollution, energy consumption, and public infrastructure costs.

Traffic congestion is eroding the quality of life in many communities. The traditional commute between suburb and city center is certainly one area of growth, but the fastest growing commute trip, especially in Southern California, is between suburbs. About one third of commute trips are from one suburb to another — trips that existing mass transit systems cannot easily carry. Additionally, an estimated 100 million Americans live in areas with health-threatening air pollution levels. Motor vehicle emissions are responsible for 45 percent of the nitrogen oxides and 33 percent of the hydrocarbons that produce smog, acid rain, and ozone problems. Finally, we currently expend billions of tax dollars to maintain the transportation infrastructure to move cars. If alternatives to the automobile were implemented, these costs could be reduced.

Reducing the number of commute trips is one way to help protect our communities' economic health and our own quality of life from increasing traffic congestion, air pollution, energy consumption, and transportation infrastructure costs. Telecommuting, virtual offices, office hoteling, and other alternative office strategies are promising, cost-effective, and currently available ways to reduce commute trips. These strategies address societal problems at the same time they address business organization and employee problems. It's a win-win-win situation for everyone involved with such programs.

Telecommuting and Distributed Work Force in Action

The list of public and private sector business organizations using telecommuting and alternative office strategies continues to grow. This transformation of the work place is changing the face of corporate America and its governmental institutions. According to a 1995 survey conducted by the Southern California Telecommuting Partnership, about 15% of Southern California employers allow some portion of their employees to telecommute. Many of these programs began following the 1994 Northridge earthquake and have grown in importance within many business organizations. Another regional study conducted

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Potential Benefits From Telecommuting

Organizations
- Enhanced employee job performance (productivity and work quality)
- Increased ability to attract and keep valued employees
- Improved employee morale and job satisfaction
- Increased access to new labor markets including the disabled, part-time, and semi-retired
- Reduced office and parking space requirements
- Less sick leave and reduced absenteeism
- Better corporate image
- Increased ability to meet air quality or transportation demand management requirements

Employees
- Improved work environment
- Enhanced employee job performance (productivity and work quality)
- Improved employee morale and job satisfaction
- Greater degree of responsibility
- Greater lifestyle flexibility
- Less commuting time and stress
- Reduced transportation costs

Society
- Less traffic congestion
- Less gasoline consumption
- Fewer vehicle emissions
- More job opportunities for disabled, part-time, and semi-retired people
- Increased number of jobs in rural areas

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by Commuter Transportation Services, Inc. (Regional Rideshare Agency) in 1994 showed about 10% of Southern California employees telecommute about one day per week.

Hughes Electronics - One Company's Experience

Hughes Electronics, a subsidiary of the General Motors Corporation, is an electronics and advanced technologies firm with approximately 30,000 employees. In 1993, they tested the concept of telecommuting in one department to mon-

itor the effects of telecommuting on employee performance, departmental operations and compliance with air quality regulations. The program was limited to allow selected employees to work from home one day a week.

"Hughes is always looking for innovative ways to improve employee morale, increase productivity and reduce employee commute travel," reports Hughes Corporate Manager, Carol Gomez. "Telecommuting is one of the solutions that addresses all of these areas."

Who Telecommuted?

Sixty people participated in the study including 10 supervisors and 50 employees. Most participants had worked for Hughes an average of nine years and had been supervised by their current managers for an average of two years.

Because the work undertaken by telecommuters in the pilot program included writing, data management and computer programming, it was considered a necessity that each telecommuter own a home computer, modem, printer, software, answering machine and, in some cases, an additional phone line. Employees purchased much of the necessary equipment after being selected to telecommute.

Because Hughes has some unique security concerns, special communications systems had to be installed in each of the telecommuters' home computers. And finally, prior to implementing the program, Hughes found it necessary to physically test all equipment and technologies to ensure compatibility and productivity.

Manager and Employee Concerns

As part of the program, both telecommuters and their managers were surveyed twice during the pilot study. The initial survey exposed some concerns from both managers and telecommuters. Many managers believed that telecommuting would help improve employee morale. However,

one-third of the managers expressed concern about their ability to delegate work in a telecommuting arrangement and about the reaction of non-telecommuters once the program was implemented. From the employees' perspective, nearly half were concerned about maintaining ties with co-workers after the program was in place.

What Were the Findings?

After the pilot program, the second survey indicated that many of the initial concerns were unfounded. In fact, both employees and managers reported a positive effect on telecommuters' performance and attitudes. All managers reported that morale had improved and nearly half of the managers reported that productivity had increased during the pilot program. Neither group found that the program created problems between telecommuters and their managers, or between the telecommuters and their non-telecommuting co-workers. One telecommuter cited the flexibility that telecommuting offers as the most important personal program benefit. "The program allowed me to participate more in my child's life and has reduced my stress level immensely."

Other telecommuters noted that their reduction in commute time was a much appreciated program benefit. Employees reported an average reduced drive of about 60 miles per week, equating to approximately two hours of driving per participant. For those employees impacted by the 1994 Northridge earthquake, the elimination of the commute stands as the single most dramatic example of the benefits to telecommuting. "Because I live in the Santa Clarita Valley, my commute route was greatly impacted by the earthquake damage. Management allowed me to increase my telecommuting days per week from one to two days, and adjust my commute travel hours for the remaining days. The concern for my commute and flexibility demonstrated by management has been the strongest indication of genuine concern for my morale since I began working at Hughes 10 years ago."

All of the telecommuters and the vast majority of managers indicated that they would recommend the program to others. In fact, many participants strongly recommended that the program be expanded to permit telecommuting more than one day per week for appropriate employees. As one employee explains, "Telecommuting has been an excellent program. I am glad to have been a part of the pilot team, and I hope that the program will continue and expand to other groups at Hughes."

See Appendix B-1 for a full copy of the Hughes Electronics case study or eleven other real case studies of business organizations in Southern California and elsewhere using telecommuting to meet business needs.

Determining the Readiness of Your Organization

As discussed earlier in this chapter, telecommuting and alternative office strategies represent part of the new paradigm of the work place. This Information Age paradigm is, among other things, marked by a distributed work force, direct involvement of major customers in product design, and an economy based upon the manipulation of information rather than manufacturing. The changes to the work place produced by these trends require difficult adjustments for some people. And with any change from the status quo comes the tendency of some people to resist the change. This resistance is actually to be expected since telecommuting and alternative workplace strategies undermine the underlying assumptions of the Industrial Age paradigm.

For example, telecommuting changes the focus of supervision of employees from one of physical presence or attendance to one of deliverables and outcomes, commonly known as Management By Objectives. Some middle managers worry that, without the employee's physical presence under the watchful eye of the supervisor, work will not get done. Others worry about the impact upon their own status within the organization. This is a legitimate concern of managers. These concerns can be best overcome by dealing with them directly. Education and training that focuses upon the business case for telecommuting and how to effectively use Management By Objective is vital

to help managers overcome their initial discomfort with new approaches to work.

Additionally, the extent to which the business organization has previously embraced communications technology will, in part, determine whether your organization is ready to also embrace telecommuting. Does your office have voicemail and e-mail? Is there a corporate culture that reinforces regular use of these tools and prompt response to messages? What types of personal computers are available? Are they networked? What is the level of self-sufficiency of most employees in using computers and office productivity software? What is the level of training and support of employees with regard to computing and communications technology? The more technology and a corporate culture that supports it, the more likely your business organization is a natural for telecommuting and alternative officing.

Making the Business Case for Telecommuting

The business case for telecommuting and alternative office strategies is made by briefing management about the success of programs elsewhere and then looking at your own business organization. The case studies in Appendix B are a great resource for building your presentation to management. After briefing management about the success in other business organizations, you should focus on answering the question: "What priority or initiative of our organization does telecommuting support?" Gil Gordon, a well-known telecommuting expert, advises that you should apply the "3:00 a.m. test" in determining an answer. Imagine you walked into your CEO's bedroom at 3:00 a.m., woke him or her up, and asked: "What are the three biggest problems facing this business organization today?" The answer will not be: "Gee, I've really been struggling with how we can do more telecommuting." Telecommuting proposals that help solve real problems of concern to upper management will be embraced more easily. Ask your management what their concerns are or sit down and write your best guess what they might be before you

begin to assemble your own telecommuting proposal.

The proposal for telecommuting should also be a collaborative effort. Usually one person, the "telecommuting coordinator" or similarly titled person, acts as the lead for a group of all stakeholders in the proposed telecommuting program. These other stakeholders include: the Executive Office, Human Resources, Information Services, Facilities/Real Estate, Risk Management, Legal, and Union Representatives. Acknowledge and include a representative of all these departments on your proposal and planning committee.

The proposal and presentation should cover the key elements of business needs met by telecommuting, costs to implement, and costs avoided. Spell out these items with as much detail as possible using spreadsheets and real company numbers. Management needs to know the down sides and risks of telecommuting as well as the benefits in order to make an informed decision.

Finally, accommodate the concerns of critics of the telecommuting proposal whenever possible. Often the issues raised by critics are legitimate problems that must be ultimately addressed in the telecommuting policy or related telecommuter agreements signed by employees. Telecommuting and alternative officing has a group of issues often raised as problems time and time again. Reading some of the resources cited in Appendix A will enable you and the telecommuting proposal committee to probably respond to the problem. You can also post questions on Internet discussion groups and bulletin boards about telecommuting and home offices. You'll be surprised at the number of people who can offer advice and further resources. There is no need to reinvent the wheel in this area when so many others have been down the same road before.

Detours Along tbe Way

As part of a new paradigm of the way we will work in the next millennium, telecommuting and alternative office strategies may represent change whose time has not yet come for your business organization. Do not be discouraged if your pro-

posal is not immediately embraced by upper management or if major changes in concept or approach are requested. New ideas are absorbed into business organizations at different rates. Persons holding key positions in the organization may later change. An earthquake or other natural disaster may spark new interest in telecommuting further down the road. New business needs or competition may drive management to take a fresh look at these ideas. If at first you don't succeed, try-try-again.

After Upper Management Gives the Green Light

Assuming that your proposal is adopted or upper management comes to you with a request to design a telecommuting or alternative workplace strategy program, the remainder of this manual provides you with a lot of helpful tools to accomplish the job. For the remainder of the manual, we will assume that you have obtained a commitment from upper management for at least a pilot project and appropriate resources to develop the program.

Note: If the reader is interested in purchasing the Telecommuting: A Formula for Business Success for a $10.00 fee, please call: (213) 740-2811.

APPENDIX B-1

Sample Policy Documents and Case Studies
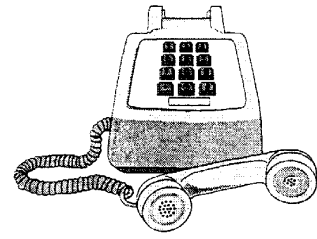
This appendix contains telecommuting policy documents from two organizations:

- Los Angeles County Metropolitan Transportation Authority (pilot program)

- Pacific Bell

These examples show how the basic components of a policy document can be modified or not included, if appropriate, to meet the specific needs of an organization.

Additionally, this appendix contains twelve case studies of telecommuting researched and written by the Southern California Telecommuting Partnership:

- Case studies

**Appendix B
Sample Policy Documents and
Case Studies**

B-1

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Policy Documents and
Case Studies

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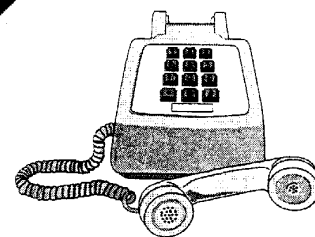
- Case studies

Appendix B
Sample Policy Documents and
Case Studies

B-1

Los Angeles County
Metropolitan Transportation
Authority

1.0

POLICY The Los Angeles County Metropolitan Transportation Authority (MTA) offers telecommuting as a periodic or full-time alternative to a daily commute to work. Selected employees normally will be eligible to telecommute part-time one to two days per week for the amount of time normally worked although full-time telecommuting is permissible when necessary and justified (e.g., full-time telecommuting used to accommodate medical restrictions, disaster recovery, etc.). This policy applies to all regular noncontract MTA employees who have worked for MTA for a minimum of six months, except the six month work requirement may be waived in order to recruit or retain highly-qualified persons. Eligible employees shall be selected for telecommuting based upon the selection criteria in this policy.

The Telecommuting Program is not a right or benefit of employees rather, it is an assignment that MTA supervisors may choose to make available to some employees when a mutually beneficial situation exists. Salary, benefits, insurance coverages, vacation, sick leave, work hours, and other terms and conditions of employment for both the Telecommuter and Telemanager remain unchanged. MTA may refuse to make telecommuting available to an employee and to terminate a telecommuting arrangement upon ten days written notice. Employees are not required to telecommute and therefore have the right to cease telecommuting and return to working at the assigned central MTA work location upon ten days written notice.

The MTA Telecommuting Program has a number of important purposes. Within MTA, the program is designed to provide a discretionary management tool for:

- Recruiting and retaining a highly-qualified work force including those with disabilities;

- Flexibly managing employees' work while maintaining appropriate management control;

PREPARED BY	APPROVED	ADOPTED
D. Wright _____ Demand Mgt	_____ Legal Counsel	Franklin E. White _____
Daniel E. Wright 3/15/94	Maxine Gifford 3/15/94	Executive Office

Los Angeles County Metropolitan Transportation Authority

POLICIES AND PROCEDURES

GENERAL MANAGEMENT

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- Increasing organizational and employee productivity;
- Enhancing employee morale, retention, and job satisfaction;
- Providing a means for disaster recovery; and
- Delivering MTA programs and services at the least administrative cost to the citizens of Los Angeles County.

Externally, the program is designed to:

- Increase MTA compliance with South Coast Air Quality Management District (SCAQMD) Regulation XV;
- Reduce vehicle miles traveled, vehicle trips, traffic congestion, and associated air pollution and energy consumption;
- Promote the development of telecommuting programs in other public and private sector organizations;
- Reduce employee commute time, stress and costs; and
- Allow desirable lifestyle flexibility to employees while maintaining high work product standards of MTA.

As the County's transportation planner and provider, MTA seeks to provide leadership by example. The MTA Telecommuting Program is intended as a model for using telecommunications as transportation.

2.0 DEFINITION OF TERMS

Telecommuting - Working remotely at home or at a location near home other than the assigned MTA work location.

Telecommuter - An employee who completes telecommuter training and is selected for telecommuting.

Telemanager - A supervisor who completes telemanager training and manages one or more telecommuting employees.

Corporate Employee Transportation Coordinator - The MTA employee responsible for the overall administration of MTA's Regulation XV Plan and its group of On-Site Employee Transportation Coordinators.

On-Site Employee Transportation Coordinator - The MTA employee who administers MTA's Regulation XV Plan at a particular work site.

**3.0
RESPONSIBILITIES** **Corporate Employee Transportation Coordinator (ETC):** shall be responsible for administering the following aspects of MTA's Telecommuting Program:

- Providing initial and ongoing training for Telemanagers and Telecommuters;

- Maintaining database and files on all telecommuting arrangements;

- Advising Telemanagers regarding the selection of employees for telecommuting;

- Coordinating arrangements for remote work locations for selected telecommuters (e.g., telework centers, MTA remote work sites, or facilities exchange program work sites);

- Periodically conducting surveys and focus groups with MTA employees; and

- Preparing an annual evaluation of the MTA Telecommuting Program.

The Corporate ETC may delegate some responsibilities to selected On-Site ETCs.

On-Site Employee Transportation Coordinator (On-Site ETC): shall be responsible for administering the following aspects of MTA's Telecommuting Program:

- Providing general information about telecommuting and schedules for MTA telecommuting training;

- Reviewing all telecommuting Application Forms for employees at the work site and forwarding such forms to the Corporate ETC; and

- If delegated by the Corporate ETC, advising Telemanagers regarding the selection of employees for telecommuting.

Telemanager: in consultation with the Corporate ETC and On-Site ETC, shall be responsible for final determination of an employee's eligibility for telecommuting as well as for continuing to manage the employee's performance.

Executive Officer or Designee: shall be responsible for final concurrence of the telecommuting arrangement.

Cost Center Manager and Telemanager: shall determine what, if any, MTA equipment will be provided to the Telecommuter in conjunction with the telecommuting arrangement and shall approve Non-Travel Business Expense Forms submitted by the Telecommuter.

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4.0 PROCEDURES

4.1 Telecommuting Training

The Human Resources Department shall provide the following types of training to MTA staff:

- Initial On-Site ETC Training
- Initial General Information Session on the MTA Telecommuting Program
- Initial and Ongoing Telemanager Training
- Initial and Ongoing Telecommuter Training

The training shall be designed to enable staff to incorporate telecommuting into the organizational culture of MTA.

4.2 Initiating Telecommuting

No employee may telecommute until his/her supervisor has completed telemanager training offered by the Human Resources Department. To initiate telecommuting, an employee reporting to a Telemanager must first complete a Telecommuting Application and discuss eligibility with the Telemanager and the responsible ETC to determine whether the job tasks fall within the Telecommuter Selection Criteria set forth in this procedure. The Information Security Unit of the MIS Department will advise the Telemanager of any past security infractions which may be relevant to the Telemanager's decision.

Telecommuting selection surveys shall be used to assess the potential for telecommuting. There are two versions — one for the Telecommuter and one for the Telemanager. Both the employee and the supervisor shall complete a Selection Survey Form and submit them to the responsible ETC who shall assist the Telemanager in making a decision.

If an employee is selected to telecommute, the Telecommuter and Telemanager shall execute a Telecommuting Agreement and file a copy with the On-Site and Corporate ETCs.

Thus, the steps an employee should take to initiate in the MTA Telecommuting Program are:

1. Obtain approval for telecommuting from the Telemanager and from the Executive Officer by completing the Telecommuting Application Form (Attachment 1). Use Telecommuter and Telemanager Selection Survey forms to assist in the selection process (Attachments 2 and 3).

2. Submit the signed Telecommuting Application Form to the On-Site ETC and the MTA Information Security Unit.

3. Finalize the telecommuting arrangement by reviewing and signing a Telecommuting Agreement (Attachment 4).

4. Attend a telecommuting training session offered by the Human Resources Department.

5. Use the Telecommuting Daily Work Plan (Attachment 5) if required by the Telemanager.

6. Participate in all telecommuting surveys and program evaluations.

4.3
Telecommuter Selection Criteria The Telemanager shall use the following selection criteria to decide whether to authorize a telecommuting arrangement:

- Noncontract employee

- Six months tenure with MTA (may be waived to recruit or retain highly-qualified employees)

- Positive performance record (may be waived to recruit or retain highly-qualified employees)

- Employee performs at least some job tasks that are consistent with telecommuting regardless of employee's job classification. Examples of such tasks include, but are not restricted to, writing, reading, editing, research, data entry, data management, analysis, planning, telephone calling, and field visits.

- Ability of supervisor to manage proposed Telecommuter at remote locations

- Concurrence of the Executive Officer.

4.4
Telemanager's Role A Telemanager may allow reporting employees to telecommute. Once an employee has been approved for telecommuting, the Telemanager shall:

1. Complete the Telecommuting Agreement Form, and submit to the Corporate ETC, On-Site ETC, and MTA Information Security Unit in the MIS Department.

2. Meet with the employee and execute an Employee Performance Contract (Attachment 6).

3. Ensure that the Telecommuter completes and submits a monthly Non-Travel Business Expense Report (Attachment 7).

4. Participate in and ensure that the Telecommuter participates in all telecommuting surveys and program evaluations.

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5. Complete any periodic Telemanager update training and ensure Telecommuters complete any periodic Telecommuter update training.

4.5
Costs of Telecommuting
Since telecommuting mutually benefits MTA and employees, it is the policy of MTA that the costs of telecommuting should be shared in that Telecommuters will pay for appropriate computers, monitors, printers, and applications software, and MTA will pay for ongoing telephone charges and other equipment costs justified in this procedure. The Cost Center Managers, based upon their estimate of the ongoing costs of telecommuting, shall include such costs in the annual budget. The Human Resources Department shall include in its training budget funds to provide the required training associated with telecommuting. A project number shall be assigned to the MTA Telecommuting Program in order to track program costs.

4.6
Equipment
The provision of equipment for telecommuting is not an entitlement of employees selected to telecommute. In the sole discretion of the Telemanager and the Cost Center Manager, MTA will provide appropriate equipment and telecommunication services to facilitate telecommuting except computers, monitors, printers, and applications software. It is impossible to articulate a strict rule regarding the provision of equipment and telecommunication services for telecommuting, but a few examples can be set forth:

- _Computers, Monitors, Printers, and Applications Software_. MTA will not purchase personal computers, laptop computers, printers, or applications software for the sole use of a single employee at a remote location. Employees shall provide their own computers, printers, and applications software. For employees who do not own a personal computer or laptop computer **and who otherwise could not be able to afford to telecommute,** MTA may, subject to availability, make a pool of surplus desktop, portable, or laptop computers with standard communications and applications software available.

- _Modems and Communications Software_. If a Telecommuter has a regular need for remote access to MTA main frame computer databases or local area networks, MTA shall pay for a modem, modem board, and/or a standard communications software package to enable appropriate remote access.

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- _Second Telephone Line_. If a Telecommuter has a frequent need for remote access to MTA main frame computer databases or local area networks and a documented reason why his/her home phone line must remain open during workday hours, MTA shall pay for the installation and ongoing charges for a second telephone line as long as such line is used **only** for MTA business purposes.

- _Ongoing Telephone Charges_. MTA shall pay for any long distance zone or toll calls between the remote work location and the Telecommuter's regular MTA work location. MTA shall pay for direct dialed long distance zone or toll calls to other persons or locations for the purpose of transacting necessary MTA business on telecommuting days. MTA shall pay for appropriate facsimile charges incurred by a Telecommuter on a telecommuting day. The Telecommuter shall pay his/her telephone bill and submit a log of MTA telephone calls along with a copy of his/her telephone bill or other receipt attached to the Non-Travel Business Expense Form.

- _Custom Calling Services_. Because most MTA office telephones already have a call forwarding function, MTA generally will not pay for custom calling services such as call forwarding, call waiting, custom ring, or similar services on a Telecommuter phone line unless a **documented business purpose** is demonstrated to the satisfaction of the Cost Center Manager.

- _Telephone Line Terminal Equipment_. MTA generally will not pay for the purchase of telephones, cellular telephones, answering machines, pagers, and facsimile machines unless a **documented business purpose** is demonstrated to the satisfaction of the Cost Center Manager.

- _Office Furniture_. MTA will not pay for the purchase of desks, chairs, filing cabinets, lamps, and other office furniture used by the Telecommuter to telecommute from home.

- _Supplies_. The Telemanager may authorize a Telecommuter to take reasonable office supplies to the remote work location.

- _Telework Center Costs_. The Executive Officer of an MTA unit may approve the placement of a Telecommuter or a number of Telecommuters in a Telework Center and MTA will pay the cost of the workspace from a cost center identified by the Executive Officer.

The examples outlined in this policy should guide Telemanagers and Executive Officers in the approval of equipment costs or telephone charges not specifically set forth here. Upon termination of telecommuting or employment, the Telecommuter shall return all MTA-provided equipment, software, or other items to the employee's MTA central work location.

4.7
Information Security
The Telemanager and Telecommuter shall comply with MTA information security policies and procedures. MTA may inspect the Telecommuter's remote computer at a mutually agreeable time to assure compliance with MTA policy and procedures.

4.8
Remote Work Spaces and Workers' Compensation
The space at home designated by the Telecommuter or the space in a Telework or Facilities Sharing location is considered an extension of MTA work space during the hours of telecommuting. During the hours of telecommuting, MTA shall cover Workers' Compensation illness and injuries arising out of the Telecommuter's employment. The Telecommuter shall maintain safe conditions and follow the same safety procedures in the remote work space as he/she would in the offices of MTA. Should an injury occur while working at a remote location, the Telecommuter shall follow normal MTA reporting procedures for such work-related claims. MTA shall assume no liability for injuries incurred in remote work spaces outside of telecommuting work hours. MTA may inspect the at-home workspace at a mutually agreeable time to assure compliance with MTA policy and procedures.

4.9
Medical Leave or Family Care Leave; Elder or Child Care
The MTA Telecommuting Program is separate from Medical Leave or Family Care and Medical Leave (FCML) and an employee cannot be on Medical Leave or FCML while telecommuting. If an employee needs to take a Medical Leave or FCML, it is presumed the employee is unable to work at the regularly assigned workplace or at a remote work location due to the reason for the leave of absence.

The care of elderly household residents, sick household residents, or children under age twelve is also inconsistent with the MTA Telecommuting Program because such care is presumed to materially disrupt the benefits of an at-home telecommuting work environment. Telecommuters shall make arrangements for such care during telecommuting hours to enable uninterrupted work time.

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4.10
Work Week Policy The MTA Work Week Policy is not necessarily incompatible with the Telecommuting Program. Depending upon the needs of the work unit, a Telemanager may authorize an employee to both telecommute and flex as long as appropriate time and work product deliverables are met.

4.11
Cancellation of Telecommuting Day When the requirements of the work unit require it, a Telemanager may cancel a telecommuting day and require a Telecommuter to report to the normal MTA work location. Cancelled telecommuting days do not accrue and may not be "made up."

5.0
FLOWCHART

5.1
Employees

EMPLOYEES
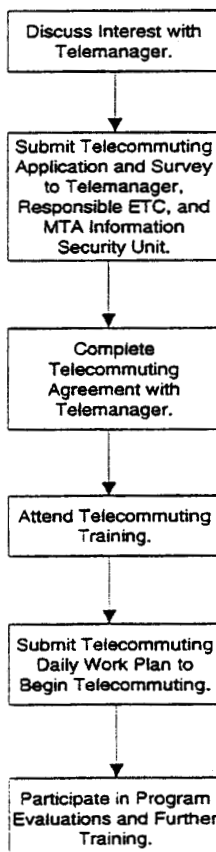
```
┌─────────────────────┐
│  Discuss Interest with │
│     Telemanager.       │
└─────────────────────┘
           │
           ▼
┌─────────────────────┐
│  Submit Telecommuting │
│ Application and Survey │
│    to Telemanager,     │
│   Responsible ETC, and │
│     MTA Information     │
│     Security Unit.     │
└─────────────────────┘
           │
           ▼
┌─────────────────────┐
│       Complete        │
│     Telecommuting     │
│    Agreement with      │
│     Telemanager.       │
└─────────────────────┘
           │
           ▼
┌─────────────────────┐
│  Attend Telecommuting │
│       Training.        │
└─────────────────────┘
           │
           ▼
┌─────────────────────┐
│  Submit Telecommuting │
│    Daily Work Plan to  │
│  Begin Telecommuting.  │
└─────────────────────┘
           │
           ▼
┌─────────────────────┐
│  Participate in Program │
│ Evaluations and Further │
│       Training.        │
└─────────────────────┘
```

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5.2
Supervisors

SUPERVISORS

Attend Telemanager Training.

↓

Review Telecommuting Applications / Utilize Selection Survey Forms.

↓

Consult with and Submit Approved Telecommuting Application to ETC and MTA Information Security Unit.

↓

Finalize Telecommuting Arrangement by Completing Telecommuting Agreement with Telecommuter.

↓

Execute or Review Employee Performance Contract.

↓

Review or Approve Telecommuting Daily Work Plans and Non-Travel Business Expense Reports.

↓

Participate in Program Evaluations and Further Training.

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**6.0
REFERENCES**

1. Family Care and Medical Leave Policy
2. Work Week Policy
3. Information Security Policy

**7.0
ATTACHMENTS**

1. Telecommuting Application
2. Telecommuter Selection Survey
3. Telemanager Selection Survey
4. Telecommuting Agreement
5. Telecommuting Daily Work Plan
6. Employee Performance Contract
7. Non-Travel Business Expense Report

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8.0 PROCEDURE HISTORY

Revision Level	Revision Date	Summary of Revision	Approved
A	03/10/94	· New Procedure	

LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY
TELECOMMUTING APPLICATION

Telecommuting is an assignment that the Los Angeles County Metropolitan Transportation Authority (MTA) may choose to make available to employees. This form is designed to be a discussion tool for your and your supervisor to examine the feasibility of telecommuting. In order to determine eligibility for the Telecommuting Program, please complete the information below.

Name _____ Department _____

Extension _____ Supervisor's Name _____

Home Address _____

Commute distance from home to regular work location (in miles) _____

The employee will telecommute from the following location _____

How many days per week (normally/or 2 days per week) do you propose to telecommute? _____

Identify day(s) of the week and hours you propose to telecommute _____

_____

Hours From _____ To _____ (Full work days only)

Why have you proposed these days and hours? _____

Discuss your typical job duties or assignments _____

_____

_____

_____

_____

_____

How will these tasks be accomplished while telecommuting? _____

_____

_____

_____

Special considerations/conditions _____

_____

If telecommuting from home, do you have a separate work space available to work? Yes ☐   No ☐   If Yes, where do you plan to work? (Please attach a photo of your proposed work space.) _____

APPROVALS

The above information has been reviewed and discussed by telecommuter and telemanager.

Telecommuter's Signature _____ Date _____

Reviewed _____ Date _____
                              Information Security Unit

Reviewed _____ Date _____
                              Employee Transportation Coordinator

Telemanager's Signature* _____ Date _____
("Telemanager's signature also signifies that employee meets all criteria set forth in the Telecommuting Policy and is recommended for this Program.)

Concurrence _____ Date _____
                              Executive Officer

Please return completed signed form to Employee Transportation Coordinator, Human Resources. Form must be signed by both the Telemanager and the Executive Officer.

(03/09/94)   GEN3AT1.FRP

M

LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY
TELECOMMUTER SELECTION SURVEY

This survey was designed as a tool to assist in the initial stages of determining suitability for telecommuting. There are two versions of this survey: 1) a Telecommuter Selection Survey to be completed by the employee, and 2) a Telemanager Selection Survey to be completed by the supervisor. The information gathered from both surveys shall be used for selecting MTA Telecommuting Program participants.

Once both Telecommuting Selection Surveys are completed, submit them to the Corporate Employee Transportation Coordinator (ETC). The ETC shall assist the Telemanager in making a telecommuting decision.

Employee Name _____

Supervisor _____ Department _____

Classification _____

1a. In five lines or less, describe what you currently do.

_____

_____

_____

_____

_____

1b. In five lines or less, describe how your current job can be adapted to telecommuting to better meet the goals and mission of your department.

_____

_____

_____

_____

_____

1c. The following three groups of characteristics relate to your existing work, to your future work as it can be adapted to telecommuting, and to you as an employee. Please rate each characteristic as either High, Medium, or Low by checking the appropriate blank.

Existing Work Characteristics	High	Med.	Low
Please rate the following according to your existing job requirements and characteristics.			
● Amount of face-to-face contact required.	____	____	____
● Ability to organize required face-to-face communications (e.g. meetings) into pre-determined time periods.	____	____	____
● Degree of telephone communications required.	____	____	____
● Clarity of objectives for a given work effort.	____	____	____
● Autonomy of operation.	____	____	____
● Ability to control and schedule work flow.	____	____	____
● Amount of in-office reference materials required.	____	____	____
● Dependence upon support staff.	____	____	____

Future Work Characteristics as a Telecommuter	High	Med.	Low
Please rate the following job characteristics in terms of their adaptibility to telecommuting.			
● Amount of face-to-face contact required.	____	____	____
● Ability to organize required face-to-face communications (e.g. meetings) into pre-determined time periods.	____	____	____
● Degree of telephone communications required.	____	____	____
● Clarity of objectives for a given work effort.	____	____	____
● Autonomy of operation.	____	____	____
● Ability to control and schedule work flow.	____	____	____
● Amount of in-office reference materials required.	____	____	____
● Dependence upon support staff.	____	____	____

CONTINUED — OVER

(03/09/94)   GEN3AT2.FRP

Employee Characteristics	High	Med.	Low
Please rate the following according to your own characteristics as an employee, and as a telecommuter.			
• Need for supervision, frequent feedback.	——	——	——
• Quality of organizational and planning skills.	——	——	——
• Importance of co-workers' input to work function.	——	——	——
• Discipline regarding work.	——	——	——
• Reliability concerning work hours.	——	——	——
• Computer literacy level.	——	——	——
• Desire/need to be around people.	——	——	——
• Desire for scheduling flexibility for any reason.	——	——	——
• Potential friction at home if telecommuting (e.g., interruptions due to caring for sick child or spouse)	——	——	——
• Level of job knowledge.	——	——	——
• Productivity.	——	——	——
• Quality of work.	——	——	——

2. What criteria are used by your manager to evaluate your work? (For example: quality of work, quantity of work, timeliness, etc. Please be specific.)

_____

_____

_____

3. Do you need physical security of the information, data and materials you work with? (Check one.)

☐ Yes (Answer question 4)
☐ No (Go to question 5)
☐ Not applicable (Go to question 5)

4. As a telecommuter, what information security issues can you anticipate? (Please be specific.)

_____

_____

_____

5. Considering the nature of your job, how often would you want to telecommute? (Check one only.)

☐ About once every two weeks   ☐ Occasionally for a special project
☐ About once a week   ☐ Full-time
☐ Two days a week

6. What kinds of work would you expect to do while telecommuting? (Check as many as apply.)

☐ Writing/typing   ☐ Talking on the telephone
☐ Word processing   ☐ Sending/receiving electronic mail
☐ Data management/computer programming ☐ Field visits
☐ Administrative   ☐ Thinking/planning
☐ Reading   ☐ Other (please specify)
☐ Research

7. Given the amount of telecommuting appropriate for you and the kinds of work you would do while telecommuting, what equipment/services do you think you need, and which of those do you currently have? (Check appropriate box.)

	Need	Currently Have
Personal computer/laptop	——	——
Monitor	——	——
Printer	——	——
Modem/communications software	——	——
Additional phone line	——	——
Applications software	——	——
Facsimile machine	——	——
Voice Mail	——	——
Other (please specify)	——	——

CONTINUED

GEN3AT2.FRP

8. Do you work from home now, or have you done so regularly in the past?

☐ Yes   ☐ No (Go to question 10)

9. If so, approximately how much? (Check one only.)

☐ Less than one day/month   ☐ Three days a week
☐ One day/month   ☐ Four days a week
☐ About once every two weeks   ☐ All the time, with weekly office visits
☐ About once a week   ☐ Several hours a day
☐ Two days a week   ☐ Sometimes in the evening

10. Do you have adequate space in your home to dedicate to telecommuting that meets the criteria contained in the MTA Telecommuting Policy?

☐ Yes   ☐ No

11. Are there any distractions/obligations that will make working at home difficult or impossible?

☐ Yes   ☐ No

12. In your opinion, after reviewing the information provided, do you consider yourself a suitable candidate for telecommuting?

☐ Yes   ☐ No   ☐ Need more information (Please specify.)

LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY
TELEMANAGER SELECTION SURVEY

This survey was designed as a tool to assist in the initial stages of determining suitability for telecommuting. There are two versions of this survey: 1) a Telecommuter Selection Survey to be completed by the employee, and 2) a Telemanager Selection Survey to be completed by the supervisor. The information gathered from both surveys shall be used for selecting MTA Telecommuting Program participants.

Once both Telecommuting Selection Surveys are completed, submit them to the Corporate Employee Transportation Coordinator (ETC). The ETC may assist the Telemanager in making a telecommuting decision.

Supervisor Name _____

Organizational Unit _____ Work Section _____

Employee Name _____

1a. In five lines or less, describe the kind of work this employee does.

_____

_____

_____

_____

_____

1b. In five lines or less, describe how the work of this employee can be adapted to telecommuting to better meet the goals/mission of your work section.

_____

_____

_____

_____

_____

1c. The following four groups of characteristics relate respectively to this employee's existing work, the type of work that can be done when telecommuting, to the employee, and to the supervisor. Please rate each characteristic as either High, Medium, or Low by checking the appropriate blank.

Work Characteristics Please rate the following according to job requirements and characteristics of the employee.	**High**	**Med.**	**Low**
• Amount of face-to-face contact required.	____	____	____
• Ability to organize required face-to-face communications (e.g. meetings) into pre-determined time periods.	____	____	____
• Degree of telephone communications required.	____	____	____
• Clarity of objectives for a given work effort.	____	____	____
• Autonomy of operation.	____	____	____
• Ability to control and schedule work flow.	____	____	____
• Amount of in-office reference materials required.	____	____	____
• Dependence upon support staff.	____	____	____

Future Work as a Telecommuter Please rate the following job characteristics in terms of their adaptibility to telecommuting.	**High**	**Med.**	**Low**
• Amount of face-to-face contact required.	____	____	____
• Ability to organize required face-to-face communications (e.g. meetings) into pre-determined time periods.	____	____	____
• Degree of telephone communications required.	____	____	____
• Clarity of objectives for a given work effort.	____	____	____
• Autonomy of operation.	____	____	____
• Ability to control and schedule work flow.	____	____	____
• Amount of in-office reference materials required.	____	____	____
• Dependence upon support staff.	____	____	____

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Employee Characteristics
Please rate the following according to the potential telecommuter's characteristics as an employee.

	High	Med.	Low
• Need for supervision, frequent feedback.	⎯	⎯	⎯
• Quality of organizational and planning skills.	⎯	⎯	⎯
• Importance of co-workers' input to work function.	⎯	⎯	⎯
• Discipline regarding work.	⎯	⎯	⎯
• Computer literacy level.	⎯	⎯	⎯
• Degree of experience in current assignment.	⎯	⎯	⎯
• Level of job knowledge.	⎯	⎯	⎯
• Productivity.	⎯	⎯	⎯
• Quality of work.	⎯	⎯	⎯

Supervisor Characteristics
Please rate the following according to your own characteristics as a supervisor.

	High	Med.	Low
• Positive attitude toward telecommuting.	⎯	⎯	⎯
• Trust employee's ability to telecommute.	⎯	⎯	⎯
• Organizational and planning skills.	⎯	⎯	⎯
• Ability to establish clear objectives.	⎯	⎯	⎯
• Provide formal feedback regularly.	⎯	⎯	⎯
• Flexibility.	⎯	⎯	⎯
• Ability to communicate with employees.	⎯	⎯	⎯
• Result and product-oriented rather than activity- or process-oriented.	⎯	⎯	⎯

2. What criteria do you use to evaluate your staff's performance? (For example: quality of work, quantity of work, timeliness, etc. Please be specific.)

_____

_____

_____

3. Does this employee need physical security of the information, data and materials he/she works with?

☐ Yes
☐ No (Go to question 5)
☐ Not applicable (Go to question 5)

4. With this employee as a telecommuter, what information security issues can you anticipate? (Please be specific.)

_____

_____

_____

_____

5. Considering the nature of this employee's work, what is the maximum amount you would want he/she to telecommute? (Check one only.)

☐ About once every two weeks   ☐ Occasionally for a special project
☐ About once a week   ☐ Full-time
☐ Two days a week   ☐ Not at all

6. What kinds of work would you expect this employee to do while telecommuting? (Check as many as apply.)

☐ Writing/typing   ☐ Talking on the telephone
☐ Word processing   ☐ Sending/receiving electronic mail
☐ Data management/computer programming ☐ Field visits
☐ Administrative   ☐ Thinking/planning
☐ Reading   ☐ Other (please specify)
☐ Research

CONTINUED

7. Given the nature of this employee's work and using the guideline contained in the MTA Telecommuting Policy, what equipment would this employee need in order to telecommute the amount you proposed for them in question 5?

☐ Personal computer/laptop   ☐ Applications software
☐ Monitor   ☐ Facsimile machine
☐ Printer   ☐ Voice mail
☐ Modem/communications software   ☐ Other (Please specify)
☐ Additonal telephone line

8. Do any of your staff work from home at all now (counting overtime)?

☐ Yes   ☐ No (Go to question 10)

9. If so, how much?

☐ Less than one day/month   ☐ Three days a week
☐ One day/month   ☐ Four days a week
☐ About once every two weeks   ☐ All the time, with weekly office visits
☐ About once a week   ☐ Several hours a day
☐ Two day a week   ☐ Some evenings

10. Please rate this employee in terms of your willingness to allow telecommuting?

                                     Initials

☐ Not at all willing.   ____
☐ Have reservations, but willing on a trail basis.   ____
☐ Completely willing.   ____

THIS AGREEMENT, effective _____, 19___, is between _____, an employee of the Los Angeles County Metropolitan Transportation Authority, ("Telecommuter"), and the Los Angeles County Metropolitan Transportation Authority, ("MTA" or "Employer"). The Employee's direct line supervisor(s) _____ ("Telemanager") shall be MTA's agent with respect to the responsibilities set forth in this agreement. The parties intend to be bound as follows:

1.   **Scope of this Agreement.** Telecommuter agrees to perform regularly assigned duties as a "Telecommuter." The MTA and Telecommuter agree that telecommuting is entirely voluntary on the part of both parties and does not constitute an employee right or benefit. Other than those duties and obligations expressly imposed on Telecommuter under this agreement, the duties, obligations, responsibilities and conditions of Telecommuter's employment with MTA remain unchanged. Telecommuter's participation in salary, pension, benefit and MTA-sponsored insurance plans shall remain unchanged.

2.   **Definitions.** The terms "remote work location" or "remote workplace" shall mean Telecommuter's residence or any remote office location approved by the Telemanager. The term "central workplace" shall mean Telecommuter's usual and customary MTA work address.

3.   **Term of this Agreement.** This Agreement shall become effective as of the date written above, and shall remain in full force and effect until terminated by either party.

4.   **Work Hours and Procedures.** Telecommuter shall normally telecommute from the hours of _____ a.m. to _____ p.m. during any day assigned to telecommute. Temporary deviations from this work schedule shall be approved by the Telecommuter's Telemanager. During these hours, Telecommuter shall be available to make or take business-related telephone calls and, if available, the Telecommuter will program his/her office telephone to forward calls to the remote work location during telecommuting business hours. On each telecommuting day, Telecommuter shall call into the central workplace at least three times to retrieve voice mail or other messages left with department support staff.

5.   **At-Home Telecommuting.** If assigned to work at home, the Telecommuter and MTA agree to take the following steps to assure maintenance of a quiet, work-oriented environment:

   Workspace Safety. The Telecommuter agrees to keep the home telecommuting workspace free of safety hazards in accordance with telecommuting training provided by MTA. The MTA may inspect the Telecommuter's workspace at a mutually agreeable time.

   Child or Family Care. Telecommuter agrees to make arrangements for the case of elderly household residents, sick household residents or children under age twelve that enable Telecommuter to work uninterrupted during telecommuting work hours.

   Household Rules for Telecommuting. Telecommuter agrees to set household rules designed to minimize household interruptions during the telecommuting work hours. Use of dedicated workspace door signs indicating Telecommuter is working is encouraged by MTA.

   Confidentiality of MTA Work Product. Telecommuter shall follow all MTA information security policies applicable to the telecommuting arrangement. MTA may inspect Telecommuter's computer to assure compliance with information security policies.

   Illness or Other Leave While Telecommuting. Telecommuter agrees that any illness or other form of leave shall be approved orally by the Telemanager and Telecommuter shall report hours of work and hours of leave in the same manner as the Telecommuter would if working at the central office workspace.

CONTINUED OVER

(03/10/94)

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(Telemanager: Complete this section only if employee is assigned to work from home.) If assigned to work at home, the remote workplace under this agreement shall be:

_____

(Street Address of Telecommuter's Home)

_____

(City, State and Zip Code)

_____
_____
_____
_____
_____
_____
_____
_____

(Description of Designated Workplace)

6.   **Telework Center Telecommuting.** If assigned to work at a telework center or a facilities sharing telework center, Telecommuter agrees to the following:

Confidentiality of MTA Work Product. Telecommuter and MTA agree that Telecommuter shall follow all MTA information security policies applicable to the telecommuting arrangement. MTA may inspect Telecommuter's computer to assure compliance with information security policies.

Illness or Other Leave While Telecommuting. Telecommuter agrees that any illness or other form of leave shall be approved orally by Telemanager and Telecommuter shall report hours of work and hours of leave in the same manner as Telecommuter would if working at the central office workspace.

(Telemanager: Complete this section only if employee is assigned to a telework center or similar facility.) If assigned to a telework or facilities sharing telework center, the remote workplace under this agreement shall be:

_____

(Name of Telework or Facilities Sharing Center)

_____

(Street Address of Center)

_____

(City, State and Zip Code)

_____
_____
_____

(Description of Designated Workspace)

7.   **Telecommuting Equipment.** Any equipment issued by MTA to Telecommuter for the purpose of telecommuting remains the property of MTA and shall be used exclusively for official MTA business purposes at the remote work location listed above or at the central work location of Telecommuter. Telecommuter agrees that MTA equipment may be recalled by Telemanager at any time. Telecommuter agrees to return any equipment issued by MTA to the agency designated repair site for service. Upon termination of telecommuting or employment with MTA, Telecommuter agrees to return all MTA-provided equipment, software, office supplies and other items to the central work location. (Telemanager must attach justification memo to this Agreement providing business purpose for each piece of equipment issued.)

CONTINUED

Telecommuter hereby acknowledges the following equipment will be issued by MTA for use in Telecommuter's telecommuting activities:

Equipment	Description of Equipment	Model No.	MTA Inventory No.
Computer			
Monitor			
Printer			
Modem			
Facsimile Machine			
2nd Telephone Line			
Telephone			
Supplies			

8. **Job Performance and Evaluation.** Telecommuter and Telemanager agree that they shall enter into and periodically update a performance contract which specifies work product or results expected from the Telecommuter and deadlines for completion. The parties agree that periodic evaluation of the Employee shall be based upon the Employee's progress in meeting performance contract goals. To assist Telemanager in supervision of the work unit, Telecommuter agrees to prepare and submit the Telecommuting Daily Work Plan to the Telemanager at least one work day prior to telecommuting, if required by the Telemanager.

9. **Computer Viruses.** The Telecommuter shall hold MTA harmless for any computer virus or other similar problem transmitted to Telecommuter's computer as a result of the telecommuting arrangement. The Telecommuter agrees to use MTA procedures to limit the risk of transmitting a computer virus or similar problem to MTA computers or networks.

10. **Income Tax Implications.** Telecommuter acknowledges that the implications for office in the home tax deductions under the federal Internal Revenue Code are completely the responsibility of the Telecommuter. MTA makes no representation whether Telecommuter properly will qualify for such deductions and strongly urges Telecommuter to seek the advice of a professional tax consultant to determine eligibility for such tax deductions.

11. **Participation in Program Evaluation.** Telecommuter and Telemanager agree to fully participate in all surveys, focus groups, training programs, and evaluations of the MTA Telecommuting Program.

12. **Cancellation of a Telecommuting Day.** Telecommuter agrees that the Telemanager may reassign work, reschedule or cancel a telecommuting day if the demands of the work unit require it. Cancelled telecommuting days do not accrue and may not be "made up."

13. **Termination of Telecommuting.** This agreement may be terminated upon ten days written notice of either party to the On-Site ETC. Telecommuter explicitly acknowledges that incurring any costs related to the telecommuting arrangement (purchase of a computer, software, furniture, etc.) creates no expectation or right to continue telecommuting.

The parties, in signing this Telecommuting Agreement, acknowledge receiving, reading and understanding the agreement and the MTA Telecommuting Policy. The parties agree to abide by the terms of this Telecommuting Agreement and any subsequent written amendments.

_____   _____
Telecommuter   Telemanager

(03/10/94)   GEN34AT4.SAM

LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY
TELECOMMUTING DAILY WORK PLAN

for

_____
(Insert Period of Time)

Telecommuter Name _____ Date _____

Telemanager Name _____

Instruction to the Telecommuter: Complete this notice to your Telemanager for every day or sequential days you propose to telecommute. If you are an authorized full-time telecommuter, please submit a work plan for each week. The work tasks must be broken down into discrete tasks or projects so that your Telemanager can assess your work plan, suggest any modifications to meet the work load of your unit, measure your success in meeting the work plan, or cancel your proposed telecommuting day to meet needs of your work unit. Submit this work plan so that your Telemanager has at least one workday to review your work plan.

Instruction to the Telemanager: This work plan is designed as a routine method of monitoring and supervising your telecommuters. Should a telecommuter's work tasks remain the same, you may wish to dispense with this work plan form. The form is intended as a notice to you by the Telecommuter of the proposed work for telecommuting. Based upon this notice you may wish to modify the work plan or reschedule/cancel the telecommuting day if the needs of your work unit require it.

I propose the following prioritized work tasks for my telecommuting day(s) listed above:

Response, if any:

(03/09/94)

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LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY
EMPLOYEE PERFORMANCE CONTRACT

Name _____ Date _____

Title _____ Division _____

1. PRIMARY TASKS AND PROJECTS SUPPORTING WORK UNIT

Please list those tasks and projects for which you will assume personal responsibility. Break each task or project down into measurable objectives or steps with a desired due date.

TASK PROJECT   OBJECTIVES OR STEPS   DUE DATE

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2. SUPPORT TASKS:

Please list those tasks and projects primarily managed by others for which you have a supporting role. Briefly describe each project, your expected support role, and the desired due date. If your supporting role is continuous, indicate "Ongoing" under DUE DATE.

TASK PROJECT   SUPPORT ROLE   DUE DATE

3. ADDITIONAL SKILLS TO LEARN OR DEVELOP:

With input from your supervisor, identify new skills you want to acquire. Identify specific training courses or projects on which you can work that will contribute to your professional development.

SKILL   TRAINING COURSE OR PROJECT

Employee and supervisor have reviewed this Performance Contract and agree that periodic Performance Evaluations shall, in part, be based upon employee's completion of work tasks and projects set forth in this Performance Contract.

_____   _____
Employee's Signature   Date

_____   _____
Supervisor's Signature   Date

Pacific
Bell

Pacific Bell

Management Telecommuting and Virtual Office Policy

Issued March 1995

Pacific Bell will now actively support and encourage managers who wish to telecommute regularly and frequently as their work assignments permit. Telecommuting provides a flexible work option for our employees and supports our corporate concerns for a cleaner environment. Telecommuting may not be appropriate for some jobs and/or individuals and may not be appropriate on a full-time basis. Our company's position on telecommuting is that managers and supervisors are expected to jointly assess the position responsibilities, personal work habits, and performance relative to telecommuting to determine if it is a viable work option for managers.

J. R. Moberg
Executive Vice President
Human Resources

Pacific Bell Management Telecommuting and Virtual Office Policy

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NOTICE:

This document is Pacific Bell's internal telecommuting and virtual office policy. The policy was developed for Pacific Bell only. It is not intended to convey legal, tax, risk management, business or any other form of advice to others. Before implementing any of the concepts or approaches reflected in this document, you should consult your own advisors in the relevant subject matter areas.

For additional copies of this policy, Pacific Bell employees should complete a P3056 form for the Centralized Distribution Center (CDC) and request item code C971.

Pacific Bell
Management Telecommuting and Virtual Office Policy
(for and to Managers of Pacific Bell)

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Human Resources Contact:

Mae Jean Go
Human Resources Planning and Work/Life Initiatives
(510) 355-3649 and FAX (510) 355-1749

INTRODUCTION

Since the management telecommuting policy was initially issued in November 1989, the complexity and amount of telecommuting within Pacific Bell have changed dramatically. These changes correspond to the increased usage and variation in telecommuting implemented throughout public sectors and private industries. Increasingly, employers are finding that allowing employees to work at home, at alternate work locations, or a variety of locations can in fact result in increased productivity and job satisfaction, and are aligned with business strategies. Telecommuting is one of the most important options in providing a flexible work environment for employees as well as an important tool to ensure continuation of business activities despite natural disasters such as earthquakes or major transportation modifications. Additionally, telecommuting acknowledges that performance and completion of job activities can be done successfully from locations other than the primary company locations, and in some instances, may be more effective if done on customer premises or within customer proximity.

This flexible work option is known by a variety of terms such as "telecommuting," "flexiplace," "telework," "location-independent work," or "work-at-home." In some instances, the person performs work from a variety of sites, where a single primary office ceases to exist, and from what may more accurately be called a "virtual office." For the purposes of its *Management Telecommuting and Virtual Office Policy*, Pacific Bell defines *telecommuting* and the *virtual office* as follows:

> *Telecommuting is the partial or total substitution of telecommunications technology for the trip to and from work. Simply put, it is moving the work to the workers, instead of the workers to the work.*

> *Virtual office is the substitution of telecommunications technology to enable working from anywhere.*

I. Pacific Bell's Position on Telecommuting

From a **strategic marketing perspective**, supporting and encouraging telecommuting in the business world is consistent with Pacific Bell's movement into the information age and the creation of the information superhighway. Many of Pacific Bell's products and services are valuable telecommuting tools, such as home office telephone lines, phone lines for facsimile equipment, enhanced telecommunications features, data transmission and basic usage.

From a **human resources perspective**, Pacific Bell views telecommuting as a management tool that can contribute to a more effective working environment, and a way to retain, recruit, reward and develop managers.

Even as telecommuting provides new solutions to employee problems such as commuting issues, it also can present **tangible advantages** to Pacific Bell. These advantages may include productivity increases, increased customer satisfaction, expanded recruitment pool, floor space reduction, and relocation expense savings. In addition, by allowing employees more individual flexibility over their work hours and workplace, organizations can gain increased flexibility and responsiveness—recognized as key to success in today's competitive marketplace.

The following pages of this document provide principles and suggested guidelines to help assist work groups in determining if telecommuting is feasible; and where it is so, for successfully imple: .enting telecommuting.

The following principles and guidelines are evolving and subject to change by the company at any time.

II. Management Telecommuting Principles and Ground Rules

Telecommuting Principles
(Assumptions which govern telecommuting and the virtual office at Pacific Bell)

- The company expects that if a management job can be telecommuted, the employee will telecommute. Telecommuting is a management tool that allows flexibility in managing employees.

- Telecommuting is a cooperative management arrangement between supervisor and employee, not an entitlement, and is based on:
  - The needs of the job, work group and company.
  - The employee's past and present levels of performance.

- Jobs suitable for telecommuting are characterized by clearly defined tasks and deliverables. A telecommuter's performance is measured by results, not work location. (See *Selection Considerations*.)

- The company's intention is to increase productivity, increase accessibility to customers, encourage real estate cost savings, and support a cleaner environment through:
  - More telecommuting, and specifically more high-frequency telecommuting.
  - Reduction of office space.

- Management employees who have been telecommuting or who begin telecommuting in their current positions should not be penalized financially for telecommuting.

- In telecommutable jobs, the company has a preference that the employee telecommute as much as possible, and eliminate dedicated office space.

- Each telecommuting arrangement will be cost-justified, subject to cost-benefit tracking and reviewed for continued mutual benefit at regular intervals.

- Each telecommuting arrangement is jointly agreed upon between supervisor and employee; telecommuting is voluntary and may be terminated, at will, at any time, by either the company or the employee.

II. Management Telecommuting Principles and Ground Rules

- Some management jobs are especially well-suited to working out of a virtual office. These jobs include, but are not limited to, sales jobs or others in which direct client or customer contact is important. Managers in those jobs are expected to spend most of their time out with customers or clients, and so their organizations may choose to implement virtual offices and eliminate or reduce their use of company office space. When these managers are not with their customers or clients, they may choose to utilize borrowed or shared space at a company location or telecommute from home. These managers and their supervisors should agree on the general parameters on how work will be accomplished, taking into account individual situations.

- Company-provided equipment at home is not an entitlement of telecommuting; depending on the job, equipment needs for telecommuters will vary from as little as phone, paper and pencil to as much as computer, modem, printer, data line and fax capability.

- Duplication of equipment is discouraged. Whenever possible, telecommuters should move their office computer equipment to their home, or trade in their personal computer for a laptop.

II. MANAGEMENT TELECOMMUTING PRINCIPLES AND GROUND RULES

Telecommuting Ground Rules
(Basic Terms of Telecommuting at Pacific Bell)

- The telecommuting work option is presently available to management employees only.

- Telecommuters' salaries, job responsibilities, benefits and Pacific Bell-sponsored insurance coverage do not change as a result of telecommuting. If an employee is identified as a full-time telecommuter at home or at an alternate location, or considered to be a mobile worker, telecommuting may have an impact on an employee's zone differential. See the Telecommuting and Virtual Office Decision Tree Matrix listed on page 34 for changes in the zone differential and mileage reimbursement. Proper approval of mileage expenses in connection with management telecommuting should be followed. Refer to S.I. 22, Bills and Vouchers, for additional information.

- Telecommuters will have regularly scheduled work hours agreed upon with their supervisors. Telecommuters will use Environment Code (EC) 6 to report the time that is telecommuted.

- Telecommuters will be as accessible as their on-site counterparts during their agreed upon regular business hours, regardless of work location. In order to increase accessibility, telecommuters should have a business line at home or a pager. Telecommuters and their supervisors should agree upon how telecommuters can ensure they are accessible to their clients, customers, and co-workers, and the response time for returning phone calls. For example, they should use voice mail greetings that reflect their daily work schedules or use pagers as appropriate.

- Telecommuters who work at home will have a designated work space agreed to by the company and maintained by the employee, and subject to supervisor visits to the designated work area, upon request by the supervisor or employee, and with the permission of the employee, to ensure that safe work conditions exist. The telecommuter will be generally responsible for absorbing any costs related to remodeling and initial set-up (e.g., furniture) of the designated work space. Telecommuters will be responsible for the ergonomics of their home offices.

II. Management Telecommuting Principles and Ground Rules

- Telecommuters will take all precautions necessary to secure proprietary information in their home and from wherever they work and prevent unauthorized access to any company system.

- Telecommuters may, at the company's discretion, be provided with telecommuting equipment (e.g., computer, modem, printer, telephone access line) as agreed upon between the supervisor or department and employee, and based on business need. Such equipment will remain the property of Pacific Bell.

- Telecommuters' tax implications related to the home work space are the responsibility of the employee. Telecommuters are advised to discuss any such issues with their tax advisor.

- Telecommuters who work at home will manage dependent care and personal responsibilities in a way that allows them to successfully meet job responsibilities.

- Telecommuters and their supervisors will join: sign a Telecommuting Agreement that can be terminated at any time by either the company or the employee. (Sample Telecommuting Agreement form provided in the Appendix.) Telecommuters and supervisors should identify specific goals, completion dates, and measurements for success by using the Performance Management Plan (PMP) for work performed by the telecommuter. A completed and updated PMP plan should be on file before the telecommuting arrangement begins. The supervisor and the telecommuter should review the Telecommuting Agreement and the PMP plan regularly and update them as necessary. Both the supervisor and the telecommuter have the responsibility to ensure that the identified tasks are completed at minimum in the same quality manner and with the same timeliness commensurate to the work done in the office.

- The misuse of company time and/or company-provided equipment will be grounds for terminating the telecommuting arrangement.

Selection Considerations

Each telecommuting arrangement should be jointly agreed upon between supervisor and employee. There are three selection criteria that should be considered while assessing the feasibility of telecommuting in a particular work group:

- The characteristics associated with the job.

- The characteristics associated with the individual telecommuter.

- The characteristics associated with the managing supervisor.

III. TELECOMMUTING GUIDELINES/CONSIDERATIONS

Selection Considerations (continued)

Job Characteristics

Which jobs are most suited for telecommuters? According to Gil Gordon, national telecommuting consultant, "Jobs with a higher degree of predictability, jobs that allow measurement of beginning and end points, and jobs in which the need for interaction with people is predictable are suitable. At the heart of many failed telecommuting attempts are attempts to integrate jobs that don't fit," he notes.

Generically, jobs well suited for telecommuting have the following characteristics:

- Low face-to-face communication requirements (communication can be easily handled over the telephone, voice mail, electronic mail or facsimile).

- Individual already works alone handling information, such as writing, reading, telephoning, planning, computer programming, word processing and data entry.

- Clearly defined tasks and deliverables.

- Measurable work activities.

- Objectives with identifiable timeframes and check points.

- Content versus process-oriented.

- Tasks requiring concentration and/or large blocks of time when the employee works independently of others.

- Can be performed without close supervision.

- Minimal requirements for special equipment.

Selection Considerations (continued)

Listed below are some of the many jobs suitable for telecommuting. This is not a complete list, but instead should be used to help both the potential telecommuter and his/her supervisor decide whether a telecommuting arrangement could be successful. Other job fields can be added as appropriate.

- Accounting
- Analysis
- Data entry
- Computer programming
- Project management
- Record keeping
- Course development
- Planning
- Systems engineering
- Writing

- Administrative work advertising
- Auditing reports
- Data processing
- Legal work
- Reading
- Research
- Market analysis
- Sales
- Telemarketing
- Word processing

Selection Considerations (continued)

Telecommuter Characteristics

Telecommuting can pose a problem of reduced management supervision over employees as work is distributed to various semi-autonomous workstations. Perhaps the best way to solve this problem is for managers to select their telecommuters by carefully gauging the compatibility of telecommuting with specific skills. The best telecommuters are strong performers with a high knowledge of the job, and who are self-disciplined, highly motivated, and comfortable being alone. Those who need constant direction, are inclined to overwork, or who do not like isolation make poor telecommuters. Telecommuting is generally not for the employee who is marginal or just learning his/her job.

It is recommended that telecommuting managers have the following set of characteristics regardless of their reasons for wanting to telecommute. These traits include:

- Proven ability to perform and high job knowledge.

- Self-motivation, self-discipline, self-direction.

- A desire to make telecommuting work.

- Above average managerial skills (e.g., good planning and organization skills, efficient in managing time, high level of communication skills, ability to establish and meet clear standards and objectives, etc.).

- Won't miss main office interaction too much; data suggests that a person who likes to be alone would work at home successfully with relatively few adjustments.

Selection Considerations (continued)

Managing Supervisor Characteristics

Just as critical to the success of a telecommuting arrangement is the role of the managing supervisor. As with a telecommuter, there are prevalent traits which help telecommuting work. They are:

- An open, positive attitude toward telecommuting.
- A mutual trust and respect in ongoing relations with the telecommuter.
- Above average organizational and planning skills.
- The ability to establish clear objectives and measurements (ability to evaluate results).
- Provides feedback regularly.
- Facilitates an open channel for communication.
- An innovative and flexible approach to managing subordinates.

III. TELECOMMUTING GUIDELINES/CONSIDERATIONS

Equipment Considerations

Telecommuting need not require computers or sophisticated telecommunications equipment, although such equipment may be deemed essential for some jobs, and may enhance the amount and effectiveness of telecommuting that can occur in other jobs. Depending on the job, equipment needs for telecommuters vary from as little as a phone, paper and pencil to as much as computer, modem, printer and fax capability.

Equipment and space considerations are essential elements of assessing the potential costs and benefits of telecommuting for work groups considering it. For example, since nearly all telecommuters work at home on a part-time basis, one attractive option growing in popularity is shared portable equipment (e.g., a district sharing a laptop portable computer).

Another important consideration is the notion of shared space: two or more telecommuters scheduling their office time so as to share a "generic" on-site office.

The need for telecommuting equipment is determined on a case-by-case basis by supervisor and employee. The company will not provide telecommuting equipment and/or access lines unless it is justified based on the needs of the business and the nature of the work assignment.
If it is determined that the employee should have company equipment in his/ her residence, the employee should obtain advance approval from the immediate supervisor by completing the Official Company Services (OCS) Telecommuting Service Request for Approval form. An approval form should be completed in its entirety, and mailed or faxed to:

> OCS SERVICE CENTER
> 666 FOLSOM STREET, ROOM 618
> SAN FRANCISCO, CALIFORNIA
> TELEPHONE: (800) 832-7800
> FAX: (415) 243-9824

Upon service order issuance, OCS will call the employee with the installation due date.

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Equipment Considerations (continued)

Once a request for company-provided telecommuting equipment/service is accepted and approved:

- It becomes the responsibility of OCS to install the necessary equipment, and repair and maintain the equipment, with the exception of micro-computer equipment.

- The employee's department will manage/track the equipment's use in meeting the department's specific business requirements and ensure appropriate ongoing business effectiveness.

- Documentation of telecommunications assets in employee's custody is placed in pocket file for appropriate inventory management (e.g., signed equipment approval letter/list, Telecommuting Agreement).

The following are additional guidelines for establishing network, data and/or equipment service in the home.

- Pacific Bell, at its sole discretion, may choose to provide equipment and related supplies for use by the employee while telecommuting, or may permit the use of employee-owned equipment subject to company rules and limitations.

- The decision as to type, nature, function and/or quality of electronic hardware, modems, systems access, data and phone lines shall rest entirely with Pacific Bell.

- The employee agrees that the use of equipment, software, data and supplies provided by the company for use at the employee's residence and/or remote location is limited to authorized persons and for purposes related to business for Pacific Bell.

Equipment Considerations (continued)

- In the event that Pacific Bell deems that the employee's job assignment no longer necessitates/requires in-home equipment services, or discovers abuse of company time or equipment, or the employee retires or is terminated, the employee is obligated to return all company-owned equipment, software, data, and supplies. The decision to remove or discontinue use of such equipment rests entirely with the company. Pacific Bell does not assume any liability for loss, damage or wear of employee-owned equipment.

- The employee agrees to designate an appropriate work space within his/her remote work location for placement and installation of any company-provided equipment (see *Home Environment* section).

- It is permissible for approved telecommuters to take a reasonable number of office supplies (pens, pencils, stationery, envelopes) home for telecommuting. The provisioning of furniture or other fixtures for telecommuters will be determined based on business needs by local management and Corporate Real Estate personnel.

- Pacific Bell will reimburse the telecommuter 100% of all business-related phone calls while telecommuting.

- The company may at any time change any or all of the conditions under which managers are permitted to telecommute and the company will not be liable for employees' costs, including but not limited to any investment in furniture or equipment for the designated work space.

Management Guidelines

Performance Management and Evaluation

A major concern for some managers may be the supervising and performance evaluation of off-site employees. When it comes to evaluating an off-site employee's work, two primary criteria should be:

1. Quality of work.

2. Completion of projects.

This involves managing by objectives and results rather than by monitoring. The suggested advice given by many consultants to ensure successful telecommuting: "Set up a plan for what is to be accomplished over 90 or 180 days, then judge all employees, whether they come to the office or telecommute, by whether those goals are met, not by the amount of time spent on the job."

The Pacific Bell Performance Management Plan (PMP) is an excellent resource for managing and evaluating the performance and development of both on-site and telecommuting employees. PMP requires that supervisors and per-formers jointly set clear performance objectives, including:

- Identifying the specific task and behavioral objectives to be accom-plished during a Performance Cycle (usually one year).

- Establishing how to measure the objectives.

- Prioritizing work by identifying which results are most crucial and which ones can be deferred.

- Analyzing how objectives support work group goals.

III. Telecommuting Guidelines/Considerations

Management Guidelines (continued)

PMP discussion with telecommuters should also include assessing the effectiveness of the telecommuting arrangement.

Based on feedback from supervisors and telecommuters, the following is recommended:

- Mutual trust and respect, maintained by ongoing and open communications, between employee and manager is key to a successful working relationship.

- Ensure that the telecommuter knows he/she is being treated equitably and his/her work is recognized.

- Define tasks as much as possible in terms of output. Having measurable results and, if possible, milestones built into the job makes remote managing much easier. Supervisors of telecommuters must manage by focusing on the employee's expected work product.

- Frequent communication between the supervisor and the telecommuter is important to ensure that tasks and performance expectations are clearly defined. Voice mail or electronic mail access for the telecommuter facilitates daily contact with the supervisor and other company personnel.

- Accessibility: Telecommuters should be easy to reach within a reasonable amount of time. (On the other hand, managers should accept that employees, whether telecommuting or on-site, may not always be readily accessible.) Telecommuters and their supervisors should agree upon how telecommuters can ensure they are accessible to their clients, customers, and co-workers, and the response time for returning phone calls.

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Management Guidelines (continued)

A completed and updated PMP plan with specific goals, completion dates, and measures for success should be on file before the telecommuting arrangement begins. The supervisor and the telecommuter should review the Telecommuting Agreement and the PMP plan regularly.

Timekeeping/Reporting and Liability

All company-wide or local management policies regarding attendance and hours worked should also apply to telecommuting managers. Environment Code 6 should be time-coded when employees telecommute.

The telecommuter and his/her supervisor should agree upon a schedule of regular work hours. This is important for the purpose of defining the telecommuter's job tour period during which the company has liability for job-related accidents or illnesses and during which workers compensation laws apply. If a schedule is not agreed upon, the work hours are assumed to be 8:00 a.m. to 5:00 p.m., Monday through Friday. Any changes in work hours or work location should be reviewed and approved by the manager and/or department in advance.

See the Telecommuting and Virtual Office Decision Tree Matrix on page 34 for guidelines for mileage reimbursement appropriate to each kind of telecommuter. Proper approval of mileage expenses in connection with management telecommuting should be followed. Refer to S.I. 22, Bills and Vouchers, for additional information.

Overtime

It is expected that, as managers of Pacific Bell, employees may be required to work beyond the customary 40 hours per week to ensure successful completion of job responsibilities. This applies to telecommuters as well as on-site managers. Managers and telecommuters should refer to the Exempt Employee Extended Effort Policy implemented June 1, 1994 for relevant issues in this area.

Management Guidelines (continued)

Compensation and Benefits

Employee salary, benefits and company-sponsored insurance coverage will not change due to telecommuting.

Information Security

The same security requirements that apply to on-site workers apply to telecommuters (e.g., Pacific Bell Information Security Policies). The telecommuting manager is responsible for ensuring such security. As with all employees, supervisors are responsible for ensuring that all appropriate agreements regarding confidentiality, trade secrets and inventions are signed by telecommuters. Remote access to company computer systems may call for special security measures.

The basic principles include, but are not limited to:

- Information is a valuable company asset and must be protected from unauthorized, incorrect or accidental access, use, modification, destruction or disclosure.

- Employees will be held accountable for securing information by taking reasonable and prudent measures to safeguard information on a routine basis.

- Information will be protected by the employee in a manner consistent with its business value, in all forms (e.g., paper, verbal, video, computer) throughout its life cycle.

Home Environment for Telecommuters

If an employee is to work at home on a regular basis, adequate space and a proper home environment are essential. The decision of where to locate a workstation will be made by the employee, and he/she is responsible for absorbing any costs related to remodeling and initial setup. (Depending upon the type of work to be done, the company may provide some equipment, e.g., computer hardware, which is discussed in the *Service/Equipment* section of this document.) A dedicated work space is highly recommended. This will enable the telecommuter to make the physical arrangements recommended in this section. It will also have the psychological advantage of allowing the employee to separate work and home, a consideration that experienced telecommuters have found helpful.

Safety and On-Site Inspections

The employee has the responsibility to maintain his/her home work space in a safe condition, free from hazards or other dangers. The employee agrees that Pacific Bell reserves the right to visit the employee's home work space for the purpose of determining that it is safe and free from hazards. Pacific Bell does not assume any liability for loss, damage or wear of employee-owned equipment, furniture, etc.

Home Environment for Telecommuters (continued)

General Environment

The same ergonomic thinking applied to a company office should be considered when creating a home office. The following is a list of recommendations to be taken into account:

- Noise - Many homes have higher noise levels than offices. Locate work site away from sources of noise, conversation and traffic—kitchen, family room, laundry room, etc. If printer is used, look into sound-absorbing mats or enclosures if sound is annoying.

- Work Surface - Glare-free surface with rounded corners and proper height (preferably adjustable).

- Monitor Display Surface - Screen placed so that no excessive head or eye movement from normal line of sight required to see screen, especially if screen is used often.

- Visual Accessibility - Clear, convenient access to all materials/items used frequently. Entire area should be free from obstacles—you shouldn't have to look over, around, or behind something to see what you're working on.

- Reach and Position - Position materials in a hierarchical order—ones used most often should be closest. Also, keeping things in a certain place enhances the feeling of order and organization.

- Chair - Probably the most important part of the work area, the chair affects posture, circulation, and amount of energy spent to maintain a given position.

- Lighting - If using display terminal, keep light sources (from lamps/windows) out of direct line of sight. Position screen so light isn't reflected back from light sources. Minimize surfaces that reflect light or glare.

Home Environment for Telecommuters (continued)

Home Adjustments

Telecommuting from home may require adjustments to individual lifestyle and family patterns. Employees need to be aware of the problems others have experienced and evaluate them in accordance with their own circumstances to ensure that both they and the company will benefit from the telecommuting experience. Considerations include:

- "Training" of the family is needed to prepare for a work-at-home arrangement.

- Some individuals experience increased stress because of conflicting work and non-work responsibilities.

- Studies of those working at home indicate that some felt they had problems with physical habits at home: they ate more, drank more coffee, and smokers smoked more.

- Work-at-home may facilitate some flexibility in family care; however, telecommuting is not an alternative to family care and major changes in current child or elder care arrangements are not advised.

- Frequent or full-time telecommuters may initially feel isolated, and they need to make adjustments in their communication patterns (e.g., using voice mail or electronic mail).

Resources

Various resources are being developed to help all parties involved in the telecommuting arrangement: the supervisor, the telecommuter, and, if pertinent, the administrative staff. Additional resources will be identified as they become available.

For more information about telecommuting, call 1-800-66VIRTUAL (or 1-800-668-4788).

Training courses and other materials to make the telecommuting arrangement more effective include the following:

- Telesis Management Institute (TMI), School of Management's course on telecommuting entitled *Alternative Workstyles of the '90's: Telecommuting*. For more information about this course, call (800) 794-2527 ext. 2.

- Several courses on ergonomics. Call Centralized Scheduling Unit at (800) 794-2527 ext. 122 for more information.

- Pacific Bell Education and Training, Computer Solutions courses on microcomputers and technical aspects of telecommuting and the virtual office. Call Centralized Scheduling Unit at (800) 794-2527.

  - *The Macintosh: Inside and Out* on general maintenance and troubleshooting

  - *The PC: Inside and Out* on general maintenance and troubleshooting

  - *End User's Introduction to Network Fundamentals* on networking issues

  - *Designing the Virtual Office: A Practical Approach to Telecommuting and Beyond* on the technical aspects of telecommuting and the virtual office. Call Mike Harvey at (510) 823-6244 for more information.

Consult Real Estate for help in redesigning and/or reducing space.

IV. Three Kinds of Telecommuters

Given the increase and expansion of telecommuting as a viable work option, it is more accurate to say that three kinds of telecommuters exist today. A Telecommuting and Virtual Office Decision Tree Matrix on page 34 summarizes these three kinds of telecommuters. It is recommended that supervisors and employees who are considering a telecommuting arrangement do the following:

1. Read this section carefully and determine which kind of telecommuting is being implemented.

2. Consult the Telecommuting and Virtual Office Decision Tree Matrix on page 34 regarding issues of office location, possible adjustments to the zone differential, and computation of mileage.

3. Review the previous sections about general guidelines for telecommuting.

4. Discuss specific goals, completion dates, and measures for success by using the Performance Management Plan (PMP) for the work to be performed by the telecommuter. Continuously monitor whether the telecommuting arrangement is still the best option for completing the job responsibilities or projects of the telecommuter.

5. Complete and sign the telecommuting agreement and specify the kind of telecommuting to be implemented.

6. Regularly report telecommuting time by using Environment Code 6.

IV. THREE KINDS OF TELECOMMUTERS

Definitions of office space: For the three kinds of telecommuters, the following terms and definitions are applicable:
- *Dedicated office space:* This is office space specifically assigned to an individual.
- *Shared office space:* This is office space that is shared by two or more individuals.
- *Hoteling:* This is office space which is assigned when the telecommuter or mobile worker comes to a company location or alternate work location on a space-available basis.
- *Primary company office location:* This is where a telecommuter would have worked in the absence of an alternate work location or home-based office.
- *Alternate location:* This is a location that is different from the home base or the primary company office location. For all alternate location based telecommuters (high-frequency, low-frequency or full-time), this can be a formal telecommuting center established by the company, or consist of office space at a telecommuting center shared with other companies. Additionally, for the high-frequency or low-frequency telecommuter, this could be another company location that is designated as the location for telecommuting.
- *Hub location:* This could be the district or division office, the location where the telecommuter's mail and paycheck are sent, or the company location where the telecommuter would work if he/she were not telecommuting as a mobile worker. The supervisor should assign the CLLC code of the hub location for purposes of assigning zone differential and mail delivery.

Home Based Telecommuter

Home based telecommuters have an office at their home and their amount of telecommuting is one of the following: (1) full-time, (2) on a high-frequency basis, or (3) on a low-frequency basis. Telecommuters are not eligible for CILOR (Commute in Lieu of Reocation).

(1) <u>Home Based, full-time telecommuter</u>: This telecommuter has an office at home and telecommutes 5 days per week. He/she may come into the work location for staff meetings or to meet with team members on a project. He/she does not have a company office location.

   Zone differential: Because all of the work schedule is done at the home-based office, the zone differential is based on the residence location. The supervisor should select the closest CLLC code to the residence location in the same city for purposes of assigning zone differential and mail de-livery.

   Mileage: This is granted for business travel minus normal commute to the telecommuter's residence location by using the closest company CLLC code in the same city.

(2) <u>Home Based, high-frequency telecommuter</u>: This person telecommutes 3 to 4 days per week from his/her office at home. Additionally, on the days he/she works in the company location, this telecommuter will share or hotel an office in the company location.

   Zone differential: The zone differential is based on the primary company location office. The supervisor should continue to use the CLLC code of the primary company location office for purposes of assigning zone dif-ferential and mail delivery.

   Mileage: This is granted for business travel minus normal commute to the primary company office location.

Home Based Telecommuter (continued)

(3) <u>Home Based, low-frequency telecommuter:</u> This person telecommutes 1 to 2 days per week from his/her office at home. Additionally, on the days he/she works in the company location, this telecommuter will have a dedicated or shared office in the company location.

Zone differential: The zone differential is based on the primary company location office. The supervisor should continue to use the CLLC code of the primary company location office for purposes of assigning zone differential and mail delivery.

Mileage: This is granted for business travel minus normal commute to the primary company office location.

Mobile Worker

The mobile worker is part of the evolving trend in telecommuting where the office as a stationary physically based office ceases to exist in what is called the "virtual office." This telecommuter has a portable office that may include a computer laptop and perhaps a cellular phone that can be easily transported to a variety of locations. He/she works full-time (5 days per week) at various locations other than his/her home or the primary company office location. He/she does not have an exclusive office in a company location but instead has a portable office. Mobile workers are not eligible for CILOR (Commute in Lieu of Relocation).

Zone differential: The zone differential is based on the hub location office. The hub location is identified at the time the telecommuting agreement is completed and signed by the supervisor and the employee. The hub location could be the district or division office, the location where the telecommuter's mail and paycheck are sent, or the company location where the person would work if he/she were not telecommuting as a mobile worker. The supervisor should assign the CLLC code of the hub location office for purposes of assigning zone differential and mail delivery.

Mileage: This is granted for business travel minus normal commute to the **hub** location.

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Alternate location based telecommuter

Alternate location based telecommuters work at an alternate location (location other than the primary company location) and their amount of telecommuting is one of the following: (1) full-time, (2) on a high-frequency basis, or (3) on a low-frequency basis. This option of using an alternate location may be chosen when the supervisor and the employee determine that a home based office for telecommuting is not feasible. If hoteling is used, the work organization may want to establish a formal schedule when alternate work location based, high- or low-frequency telecommuters do come into the company work office ("hoteling"); or more informally designate space and guidelines for when the telecommuter comes to the company work office. Telecommuters are not eligible for CILOR (Commute in Lieu of Relocation).

(1)   Alternate location based, full-time telecommuter: This telecommuter has an office at the alternate location which is **not a company location** and telecommutes 5 days per week. He/she may come into the work location for staff meetings or to meet with team members on a project. The alternate location may be a formal telecommuting center established by the Company or consist of office space at a telecommuting center shared with other companies.

> *Zone differential:* Because the majority of the work schedule is done at the alternate work location, the zone differential is based on the alternate work location. The supervisor should select the closest CLLC code to the alternate work location in the same city for purposes of assigning zone differential and mail delivery.

> *Mileage:* This is granted for business travel minus normal commute to the alternate work location.

Alternate location based telecommuter (continued)

(2) <u>Alternate location based, high frequency telecommuter</u>: This person telecommutes 3 to 4 days per week from an alternate location where the office is either dedicated or shared. Additionally, on the days he/she works at the primary company location, this telecommuter will share or hotel an office in the company location. The alternate location may be a formal telecommuting center established by the Company, consist of office space at a telecommuting center shared with other companies, or be another company location that is designated as the location for telecommuting.

Zone differential: The zone differential is based on the primary company office location. The supervisor should continue to use the CLLC code of the primary company location office.

Mileage: This is granted for business travel minus normal commute to the primary company office location.

(3) <u>Alternate location based, low-frequency telecommuter</u>: This person telecommutes 1 to 2 days per week from an alternate location where the office is either shared or hoteled. Additionally, on the days he/she works at the primary company location, this telecommuter will have either a dedicated or shared office in the company location. The alternate location may be a formal telecommuting center established by the Company, consist of office space at a telecommuting center shared with other companies, or be another company location that is designated as the location for telecommuting.

Zone differential: The zone differential is based on the primary company office location. The supervisor should continue to use the CLLC code of the primary company location office.

Mileage: This is granted for business travel minus normal commute to the primary company office location.

TELECOMMUTING AND VIRTUAL OFFICE DECISION TREE

IF your work location is:	AND the amount of time you are telecommuting per week is:	THEN your office is:	AND your zone differential is based on:	AND your mileage is granted for business travel minus commute to:
Home based	Full-time (5 days per week)	Your residence (no company office location)	Your residence location (closest company CLLC code in same city)	Your residence location (closest company CLLC code in same city)
	High frequency (3 to 4 days per week)	Your residence AND Shared or hoteled company location office	Primary company office location	Primary company office location
	Low frequency (1 to 2 days or less per week)	Your residence AND Dedicated or shared company location office		
Mobile based	Full-time	Portable (no company office location)	Hub location	Hub location
Alternate location based	Full-time (5 days per week at a non-company location)	Alternate location (no company office location)	Alternate location (closest company CLLC code in same city)	Alternate location
	High frequency (3 to 4 days per week at any alternate location)	Dedicated or shared office at alternate location AND Shared or hoteled office at primary company location	Primary company office location	Primary company office location
	Low frequency (1 to 2 days or less per week at any alternate location)	Shared or hoteled office at alternate location AND Shared or dedicated office at primary company location		

Definitions of office space: For the three kinds of telecommuters, the following terms and definitions are applicable:

- *Dedicated office space:* This is office space specifically assigned to an individual.
- *Shared office space:* This is office space that is shared by two or more individuals.
- *Hoteling:* This is office space which is assigned when the telecommuter or mobile worker comes to a company location or alternate location on a space-available basis.
- *Primary company office location:* This is where the telecommuter would have worked in the absence of an alternate location or home-based office.
- *Alternate location:* This is a location that is different from the home base or the primary company office location.

OFFICIAL COMPANY SERVICES (OCS)
TELECOMMUTING SERVICE
Request for Service Approval Form

Please complete this form in its entirety and return to : OCS Service Center, 666 Folsom, Room 618, San Francisco, fax number 415-243-9824. Refer questions to the OCS Service Center at 1-800-832-7800. (NOTE: OCS DOES NOT PROVIDE TELECOMMUTE LINES INTO INDEPENDENT TERRITORY. THE TELECOMMUTER SHOULD CALL THEIR LOCAL TELEPHONE COMPANY FOR NEW LINES.)

Employee Name: _____ Date: _____

ARC: _____ Title: _____ Social Security No.: _____

Residence Address: _____

Work Address: _____

Home Telephone No.: _____ Work Telephone No.: _____

The service and/or equipment required for this request is: _____

_____

_____

_____

_____

The billing and toll statement should be forwarded to:

Dept.: _____ Title: _____ Telephone No.: _____
Skip-level Second, Third level, or above

ARCs: Originating/Billing ARC _____ Capital ARC _____ Expense ARC _____

The approval signature will confirm that the Telecommuting Agreement, contained in the 1995 "Pacific Bell Management Telecommuting and Virtual Office Policy," has been reviewed and signed by the Employee, and the Agreement has been placed in the Employee's personnel folder for the duration of the use of this service.

Referral name regarding questions about the approval of this request:

Name: _____ Telephone No.: _____

Approval signature: _____ Date: _____
Employee's Immediate Supervisor

Printed Approver's Name and Title: _____

I have read and understand the attached Management Telecommuting and Virtual Office Policy, and agree to the duties, obligations, responsibilities and conditions for telecommuters expressed in that document, in addition to my normal duties, obligations and responsibilities as a Pacific Bell management employee.

As a telecommuter, I have reviewed the three kinds of telecommuting on the Telecommuting and Virtual Office Decision Tree Matrix with my supervisor and understand that the kind of telecommuting that applies to my situation is the following:

_____

(specify kind of telecommuting that is being undertaken with amount of frequency)

I agree that, among other things, I am responsible for establishing specific scheduled telecommuting work hours, furnishing and maintaining my designated work space in a safe manner, employing appropriate telecommuting security measures and protecting company assets, information, trade secrets, and information systems. If I have a home-based office, I am responsible for ergonomic requirements for my home-based office.

I understand that telecommuting is voluntary and I may stop telecommuting at will, at any time. I also understand that the company may, at will, at any time, change any or all of the conditions under which I am permitted to telecommute or withdraw permission to telecommute.

Additionally, I have completed the following pertinent sections.

1. Remote Work Location:

_____

Street Address

_____   _____   _____
City   *State*   *Zip Code*

❏ Employee Residence   ❏ Company Premise   ❏ Other

Description of Designated Work Space at remote work location:

_____

2. Telecommuting Schedule:

❏ On a weekly basis as follows: _____
                                                           (regular telecommuting days)

❏ On a monthly basis as follows: _____
                                                           (regular telecommuting dates)

☐ No regular schedule - separate permission for each telecommuting day

3. Regular Telecommuting Work Hours: _____ to _____

4. Company Assets (if any) provided for use at remote work location:

   Description   *ID Number*

   _____   _____

   _____   _____

5. Company Information Systems (if any) to which employee will have access from remote work location:

   _____

   _____

6. Non-Company equipment, software and data permitted to be used with Company Assets or Company Information Systems (if any) to which employee has access from remote work location:

   Item   *Company Assets/Information Systems with which item can be used*

   _____   _____

   _____   _____

7. Other:

_____   _____
Dated   *Employee Signature*

_____   _____
Dated   *Supervisor Signature*

Case
Studies

Hughes Electronics, a subsidiary of the General Motors Corporation, is an electronics and advanced technologies firm with approximately 30,000 employees. In 1993, they tested the concept of telecommuting in one department to monitor the effects of telecommuting on employee performance, departmental operations and compliance with air quality regulations. The program was limited to allow selected employees to work from home one day a week.

"Hughes is always looking for innovative ways to improve employee morale, increase productivity and reduce employee commute travel," reports Hughes Corporate Manager, Carol Gomez. "Telecommuting is one of the solutions that addresses all of these areas."

Who participated in the pilot study?

Sixty people participated in the study including 10 supervisors and 50 employees. Most participants had worked for Hughes an average of nine years and had been supervised by their current managers for an average of two years.

Because the work undertaken by telecommuters in the pilot program included writing, data management and computer programming, it was considered a necessity that each telecommuter own a home computer, modem, printer, software, answering machine and, in some cases, an additional telephone line. Employees purchased much of the necessary equipment after being selected to telecommute.

Because Hughes has some unique security concerns, special communications systems had to be installed in each of the telecommuter's home computers. And finally, prior to implementing the program, Hughes found it necessary to physically test all equipment and technologies to ensure compatibility and productivity.

Manager and Employee Concerns

As part of the program, both telecommuters and their managers were surveyed twice during the pilot study. The initial survey exposed some concerns from both managers and telecommuters. Many managers believed that telecommuting would help improve employee morale. However, one-third of the managers expressed concern about their ability to delegate work in a telecommuting arrangement and about the reaction of non-telecommuters once the program was implemented. From the employees' perspective, nearly half were concerned about maintaining ties with co-workers after the program was in place.

HUGHES ELECTRONICS PROGRAM

- Program established: 1993
- Number of telecommuters: 60
- Weekly commute time reduced: 2 hours per employee

The Results

After the pilot program, the second survey indicated that many of the initial concerns were unfounded. In fact, both employees and managers reported a positive effect on telecommuters' performance and attitudes. All managers reported that morale had improved and nearly half of the managers reported that productivity had increased during the pilot program. Neither group found that the program created problems between the telecommuters and their managers, or between the telecommuters and their non-telecommuting co-workers. One telecommuter cited the flexibility that telecommuting offers as the most important program benefit.

SOUTHERN CALIFORNIA TELECOMMUTING PARTNERSHIP

"The program allowed me to participate more in my child's life and has reduced my stress level immensely."

Other telecommuters noted that their reduction in commute time was a much appreciated program benefit. Employees reported an average reduced drive of about 60 miles per week, equating to approximately two hours of driving per participant. For those employees impacted by the 1994 Northridge earthquake, the elimination of the commute stands as the single most dramatic example of the benefits to telecommuting. "Because I live in the Santa Clarita Valley, my commute route was greatly impacted by the earthquake damage. Management allowed me to increase my telecommuting days per week from one to two days, and adjust my commute travel hours for the remaining days. The concern for my commute and flexibility demonstrated by management has been the strongest indication of genuine concern for my morale since I began working at Hughes 10 years ago."

The Future

All of the telecommuters and the vast majority of managers indicated that they would recommend the program to others. In fact, many participants strongly recommended that the program be expanded to permit telecommuting more than one day per week. As one employee explains, "Telecommuting has been an excellent program. I am glad to have been a part of the pilot team, and I hope that the program will continue and expand to other groups at Hughes."

For more information on telecommuting, contact the Southern California Telecommuting Partnership at:

1-800-6INFOHWY (800-646-3649)
Or visit us on the Internet at http://www.sctp.org

Headquartered in downtown Los Angeles, First Interstate Bank is a large financial institution with 3,500 employees in the Los Angeles area alone. In 1991, the bank developed an extensive home-based work program to address employees' needs for flexibility and management's desire for an increase in worker productivity.

"Many employees struggle to balance home and work responsibilities," reports First Interstate Bank Vice President Tamara Sharp. "The traditional world of banking has been changing to meet employees' needs for greater flexibility in the workplace."

Who can telecommute?

"About one-fifth of bank employees are in jobs that allow for telecommuting," according to Sharp. "Positions such as project managers, attorneys and analysts are our best candidates." Sharp further explains that employees who have regular supervisory responsibilities or are involved in a customer-service function are not eligible for the telecommuting program.

First Interstate also requires that potential telecommuters be employed with the bank for at least one year before entering the program. This requirement not only allows the employee to become familiar with corporate policies and procedures, but also allows management to evaluate how effectively an employee works and whether he or she is a "self-starter." Appropriate telecommuting candidates are high achievers and have job duties that are conducive to working away from the office.

FIRST INTERSTATE BANK FAST FACTS

- Program established: 1991
- Eligible telecommuters: 700
- Stated benefits: flexibility and increased productivity

How do telecommuters get started?

Employees who meet the qualifications for the program must submit a "Flexible Scheduling Request Form and Equipment Checklist" to their supervisor. The form provides the supervisor with a sense of why the employee is requesting to telecommute, and whether or not the employee can effectively work from home. The checklist also assesses what equipment an employee must have to perform his or her job. The supervisor then reviews the request and determines eligibility. Employees selected for telecommuting must review and sign a Telecommuter Agreement, which outlines the program's policies and procedures.

"Although we offer telecommuting to all qualified employees, the program is a privilege and not an entitlement," adds Sharp. "The program is continually monitored to ensure the success of the employee and management's goals."

Telecommuters arrange their work schedule and work location with their supervisors. In certain cases, bank employees may be allowed to work from a telecenter. However, most telecommuters choose to work from a home office. First Interstate provides laptop computers for some telecommuters and reimburses all business-related telephone calls.

SOUTHERN CALIFORNIA TELECOMMUTING PARTNERSHIP

What has the program achieved?

Employees and supervisors report a positive experience with telecommuting. Supervisors cite that telecommuters seem to be working more hours and taking less time off. Employees have cited benefits such as fewer distractions and convenience in setting up child-care arrangements.

Pam Sheppard-Knapp, assistant vice president responsible for training leads, found that she needed greater flexibility after having a child. "Telecommuting allowed me the opportunity to manage my child-care situation while continuing to be effective at work. I feel that telecommuting not only addressed my child-care scheduling needs, but it also helped me to be more productive in performing my daily responsibilities." Sheppard-Knapp also found that her privacy needs are better filled through telecommuting, noting that handling confidential issues from her home office is often easier than trying to address sensitive subject matter in an open-office environment.

"First Interstate's openness to provide greater flexibility has resulted in a win-win situation where employees have the opportunity to coordinate work schedules that are more conducive to their personal lives," reports Sharp. "The bank, in return, gets employees who are more productive."

For more information on telecommuting, contact the Southern California Telecommuting Partnership at:

1-800-6INFOHWY (800-646-3649)
Or visit us on the Internet at http://www.sctp.org

Health Net is the second largest Health Maintenance Organization (HMO) in California. They have been in business for 12 years and employ approximately 1,700 employees. In the beginning of 1993, Jim Wilk, senior vice president of human resources and administration, was wrestling with the question of where to house their expanding work force when a letter arrived from Los Angeles County Supervisor Michael Antonovich introducing the Antelope Valley Telebusiness Center and its generous "first year free" incentive program.

Telecommuting: Then to Now

Because working from a telecenter was a new idea for the company, Health Net chose two departments to head a telecommuting pilot project: customer service and claims processing.

Initially, Health Net reserved 5 work stations at the Center with 10 telecommuters rotating on different days, sharing desks at both the Center and the regular office. To bridge the communications gap between the facilities, Health Net elected to install their own equipment, enabling telecommuters to be "on-line" with the corporate office. Within only a few months, the telecommuting program proved successful and management decided to expand its scope to include 10 workstations and 4 departments including: claims processing, customer service, correspondence and legal.

Today, Health Net utilizes 36 workstations at the Antelope Valley Telebusiness Center and has added 10 home-based telecommuters to the program. Although many of the center-based telecommuters now work full-time from the Center and communicate with the office via telephone and electronic mail, they still drive to the corporate office for regular staff meetings and ongoing training. Health Net's home-based telecommuters work from home on a variable work schedule that is dependent on their work load.

HEALTH NET HIGHLIGHTS

- Program established: 1993
- Number of telecenter-based telecommuters: 36
- Number of home-based telecommuters: 10
- Annual cost savings: 10%

Key Components to Health Net's Program

There are several key components to Health Net's successful implementation and operation of its telecommuting program. First, because telecommuting supports Health Net's corporate business strategy, the program received tremendous support from CEO Roger Greaves. Second, those managers working with the pilot group of telecommuters lived in the Antelope Valley themselves and understood the impact of a long commute. And finally, several managers took part in the program as telecommuters, at least on an occasional basis. This gave supervisors the perspective they needed to better manage telecommuters.

Bottom-Line Benefits

Health Net has realized definite bottom-line benefits through their telecommuting program. Most dramatic is the marked reduction in overhead for telecommuters when compared to costs associated with the employees who are based in the corporate office. In addition, the company has documented a 10 percent cost savings due to an increase in productivity and improved employee retention.

Using telecommuting as a standard tool for disaster preparedness has also proven to be a bottom-line benefit. After the 1994 Northridge earthquake, Health Net's corporate building was uninhabitable for several days. However, losses in time and productivity were kept at a minimum because the crucial customer service lines, maintained at the Antelope Valley Telebusiness Center, were still in full operation.

From both bottom-line and logistical perspectives, the telecommuting program at Health Net continues to be a model for other companies across the country.

For more information on telecommuting, contact the Southern California Telecommuting Partnership at:

1-800-6INFOHWY (800-646-3649)
Or visit us on the Internet at http://www.sctp.org

SOUTHERN CALIFORNIA TELECOMMUTING PARTNERSHIP

The County of Los Angeles employs over 80,000 people and is not only one of the largest organizations using telecommuting in the United States, but also is among the largest government agencies in the entire world. The County currently has more than 4,000 telecommuters and offers the program to an additional 25,000 employees who are eligible for the program.

Telecommuting was first offered to County employees in 1989 as a means of reducing operating costs, increasing productivity and addressing the severe traffic and air quality problems created by automobile travel in Southern California.

"Telecommuting offers many benefits," says Los Angeles County Supervisor Michael Antonovich. These benefits include space savings, diminished traffic congestion, improved air quality, increased productivity and greater opportunities for the physically challenged."

How does the program work?

Since its inception, the telecommuting program has evolved into three arrangements: 1) Home-based telecommuting; 2) Telebusiness Centers and Telework Offices; and 3) Emergency/Short-Term Telecommuting.

Regardless of the specific arrangement, all employees interested in telecommuting must first ask their supervisor for permission to join the program. Second, employees submit a request form to the designated telecommuting manager in their department. The telecommuting manager coordinates training with the County's Telecommuting Program Director. In cooperation with their manager and the Telecommuting Program Director, employees can select the appropriate work location and arrangement.

Reimbursement for telecommuting expenses and equipment needs are addressed at the departmental level on a case-by-case basis. Most departments reimburse telephone charges and several departments provide computer equipment for telecommuting.

COUNTY OF LOS ANGELES HIGHLIGHTS

- Program established: 1989
- Number of telecommuters: 4,050
- Annual cost savings: $17.7 million

Selected telecommuting departments

Assessor's Office

The Assessor's Office originally became involved in the County's telecommuting program by allowing five clerical employees to work from home three days a week. Although the manual coding done by these telecommuters did not require a computer, it did require office materials and a quiet working environment.

The results in the first month were so dramatic that the department immediately added 15 employees to the program. Management found that telecommuters were producing at a level well-beyond workers at the office. In fact, after tracking productivity over time, management has documented a 42 percent increase in productivity.

Children's Services, Probation Department and Public Services

Children's Services (1,023 employees), Probation Department (286 employees) and Public Services (782 employees) have a significant number of employees who telecommute each day. Many of the employees work in the field and driving back to the office after visiting a client is not an effective use of time. To reduce travel time and increase productivity, field staff now complete their paper work from home and submit their work via computer modem. These employees report that they feel less stressed and more productive.

Chief Administrative Office

Managers in the Chief Administrative Office are often assigned special projects that require immediate attention and extensive work. To help meet deadlines, managers are allowed to work from home as needed. This option has helped managers balance special projects with their ongoing job responsibilities.

Telework Offices

The County of Los Angeles was the first local agency to establish a partnership with 14 cities to identify and use available office space closer to employees' homes. Evelyn Gutierrez was the first Los Angeles County Senior Manager to work near her home at a San Dimas Metropolitan Water District office. Every other Friday, Gutierrez eliminates a two-hour drive to work by using this alternative office, which is only two miles away from her home. Over 29 County employees now work out of city offices near their homes, at no additional cost to the County or the employee.

SOUTHERN CALIFORNIA TELECOMMUTING PARTNERSHIP

What are the savings?

Faced with continuing budget cuts and a three year hiring freeze, the County has used telecommuting as an effective tool to reduce costs and in many cases, increase employee productivity. According to a study conducted by the Chief Administrative Office, the County is saving nearly $16.6 million annually from increased telecommuter productivity In addition, telecommuters are saving the County $1 million annually in reduced sick leave as telecommuting reduces stress and the illnesses caused by stress.

From a community perspective, telecommuters have helped the environment by eliminating 144,000 hours of travel time on overcrowded freeways, saving 288,000 gallons of gasoline and decreasing 73 tons of pollutants each year.

Employees have also enjoyed the cost savings of telecommuting. The County estimates that individual telecommuters are saving $400 each year through lower automobile expenses.

Gutierrez, now director of telecommuting programs, reports, "Telecommuting options have provided our employees with effective choices which benefit the employee, employer and the community."

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SOUTHERN CALIFORNIA TELECOMMUTING PARTNERSHIP

Nestled in the foothills of Rancho Cucamonga is Chaffey College, a pioneer in education since its establishment by George and William Chaffey in March 1883. Presently, with a student population of approximately 14,000, this two-year institution continues to set an example for other institutions of higher education across the country.

In 1991, Chaffey College initiated an innovative telecommuting program to primarily serve college professors who might otherwise not be available to work at the College. "We've only just begun to touch the tip of the iceberg with regards to the implementation and integration of telecommuting and telecommunications," says Telecommuting Coordinator David Ramirez.

Why is telecommuting a good solution?

Typically, college instructors hold classes two or three days a week. At Chaffey College, instructors are given the opportunity to telecommute on the required "office-hour" days so that they are able to prepare lesson plans, grade exams and review the latest research in their field, in the location where they feel most comfortable — their home. Because office space is limited and often shared by two people, working from home several days a week also helps to alleviate distractions and inter-ruptions. Instructors who are telecommuting and sharing office space can rotate their schedules so that student conferences can be held privately, providing a better environment to discuss class-related projects or issues.

How does the program work?

Telecommuting is a decentralized management program that enables each department to determine the logistics of the program's implementation. However, in every department, the telecommuting arrangement may be terminated by the instructor or the College at any time.

College instructors are responsible for the purchase and maintenance of telecommuting equipment. They are also responsible for maintaining a safe work space in their home.

Finally, the program mandates that telecommuting does not relieve instructors of the duties, obliga-tions and responsibilities each has to the College and its students. Notably, this includes the require-ment that instructors participate in on-campus committees and student-related activities. The idea is that telecommuting is not a substitute for valuable face-to-face time with campus adminis-trators or students.

CHAFFEY COLLEGE FAST FACTS

- Program established: 1991
- Number of telecommuters: 51
- 5 year projection: 154 telecommuters
- Primary benefits: reduced real estate needs, fewer distractions

The New Frontier

Chaffey College has only begun to explore the area of telecommuting and advanced telecommu-nications. On the horizon are concepts such as "distance education" and "virtual classrooms." In such programs, instructors and students are linked by two-way video conferencing and audio transmission across the country or across the world. Chaffey College is a leader in the implementation and integration of these and other alternative work space programs and continues to set the pace for the next millennium.

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Or visit us on the Internet at http://www.sctp.org

California State University, Northridge (CSUN) is located at the epicenter of the 1994 Northridge arthquake. As a result of the quake, the University experienced extensive damage. Classroom and parking facilities, as well as the administrative offices were inaccessible.

Manager of Transportation Programs Astrid Logan explains, "Suddenly, we had to fit a lot of people into a small amount of space." For example, the Admissions and Records Department consisting of 100 employees had to be moved to an area of only 30 by 40 square feet.

Another issue was commute time to CSUN. Many employees living in the damaged Northridge area relocated to stay with friends and relatives in outlying areas, which resulted in unusually long commutes. In addition, employees living outside the immediate Northridge area were severely impacted by the damaged transportation infrastructure. For example, employees living in the Santa Clarita Valley had four-hour, one-way commutes.

In response to this emergency, the University implemented a combined telecommuting, split shift and flexible work-schedule program in order to get the school up and running for the Spring Semester that was about to begin.

Emergency Response Program

The University put together an emergency response program in one week. Various departments discussed the emergency plan, including Human Resources, which reviewed the plan for liability issues and potential conflict with union contracts. A telecommuting policy was drawn up and distributed to the various campus departments. A letter describing the emergency response program was distributed to faculty and staff within two weeks of the quake.

Equipment and Services

Many employees took their school computers home. Those who already had computers at home purchased modems. Several departments purchased laptop computers, which allowed employees to work from other locations. Regardless of how employees obtained their equipment, all telecommuters had to be in communication with the University.

CSUN QUICK FACTS

- Emergency program established: 1994
- Primary benefits: rapid recovery, despite extensive quake damage
- Interesting fact: program has expanded due to University President's endorsements

Telecommuting Before and After the Northridge Earthquake

Prior to the earthquake, the University had an informal telecommuting program. A small number of employees, mainly faculty, were participating.

After the earthquake, decision-makers who had mainly seen the telecommuting program as a means of getting over the hurdle of the emergency phase, agreed to maintain the telecommuting program. And now, as a result of the quake experience, formal telecommuting policies and procedures are in the process of being adopted. CSUN President Blenda Wilson formally encouraged telecommuting among faculty and staff after the emergency was over. "The school wants to promote an image that it is responsive to employees' needs."

Today, employees are asking to telecommute not just for emergencies, but also for other reasons such as maternity leave. "It's a win-win situation because the University can retain the expertise that these employees offer," states Logan.

In one example, an employee who began telecommuting during the emergency, requested to work from home after a subsequent surgery. No one else was able to perform her duties, so her absence from work would have been problematic for the school. CSUN moved her computer, printer and facsimile machine to her home, and set up her work phone so that incoming calls to her school office would be directly transferred to her home. This design was seamless and callers had no idea she was working from home.

Currently, the University is in the process of switching to fiber-optic phone lines in order to improve electronic mail capabilities and provide extensive Internet access. This will also improve telecommunications from home. As departments plan their equipment needs, they place careful consideration on buying laptop computers in order to allow for more flexibility (i.e. the option of telecommuting) and to be prepared in the event of another emergency.

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SOUTHERN CALIFORNIA TELECOMMUTING PARTNERSHIP

"Advances in call distribution equipment will revolutionize the reservations and phone sales industry. With such new technology, calls can be directed to any location, which allows for the expansion of telecommuting," according to Mary Ann Stewart, senior employee transportation coordinator for United Airlines. Actually, the revolution at United Airlines began a few years ago.

In 1992, United Airlines' Information Services Department (ISD) implemented a telecommuting program to meet trip-reduction standards set by the South Coast Air Quality Management District (SCAQMD). Without any costs to the company, the ISD began a home-based telecommuting program for their Los Angeles employees.

How does the program work?

Prior to beginning the program, employees must complete an evaluation form to identify any potential obstacles to working from home. After receiving supervisor approval, the employee and the supervisor sign a formal telecommuting agreement and discuss the guidelines of the program including performance standards. Both the employee and the supervisor reserve the right to terminate the telecommuting arrangement at any time.

To facilitate communication with their supervisors, telecommuters submit a written work plan the day before telecommuting. Telecommuters also submit a list of accomplishments the following day. Managers use these work plans as tools to evaluate employee organization and productivity on annual performance reviews.

Contrary to initial expectations, telecommuting does not impose any added costs for the company. Telecommuters designate a separate home office area that meets company safety standards and provide all the equipment necessary to telecommute. The company does not reimburse telecommuting expenses, however employees report that the savings in time, car depreciation and fuel costs far exceed the costs of telecommuting.

UNITED AIRLINES FAST FACTS

- Program established: 1992
- Number of telecommuters: 185
- Increase in productivity: 20-30%

How has the program expanded?

Currently, 10 percent of ISD employees telecommute at least one day a week. Recently, United Airlines established a telework center in Moreno Valley, California, from which 126 reservations agents work full-time.

Building upon the success of the ISD's program, United Airlines has expanded telecommuting to include their account executives who interact with travel agents to help solve seat assignment dilemmas, clarify pricing questions and explain contracts. In fact, the account executives have now moved into "virtual offices." Outfitted with laptop computers, cellular telephones and other equipment, they no longer need to work from a traditional office, making them more available to serve customer needs.

This innovative strategy has placed United Airlines ahead of the competition in the eyes of the account executive and the travel agent. Account executives express an appreciation for the company's support of their efforts, and customers perceive that the account executives are "in the neighborhood" rather than at the airport or another distant location.

What are the bottom-line benefits?

During the first year of the program, 1992-93, telecommuters showed a 20 - 30 percent increase in productivity. The Moreno Valley telework center has reduced over 4,000 employee trip miles per day, not only meeting air pollution reduction goals, but also enhancing the company's pro-environment image. With the establishment of the telework center, United Airlines has been able to tap a new work force. Also, supervisors report that telework center employees seem happier and more productive, which leads to better customer service.

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SOUTHERN CALIFORNIA TELECOMMUTING PARTNERSHIP

Unisys Corporation is an international information management company that offers information services and technological expertise to the private and public sector. One of the company's west coast facilities is in Mission Viejo, California where approximately 1,000 of the company's 40,000 employees are based.

In 1991, Unisys Corporation's Mission Viejo facility began a telecommuting program in order to help meet air quality regulations and to assist in recruiting some of the best computer programmers in the region. Consequently, most of Unisys' telecommuters are software engineers working in the software development department. These employees still have regular offices at the company, even though many telecommute up to three days per week.

How is the telecommuting program structured?

"We don't have to do a lot of maintenance on the telecommuting program at this point; employees know the parameters, we give managers telecommuting materials and telecommuters work with their managers when they want to be involved in our company's program," says Sue Reed, human resources associates business partner.

Unisys invested a great amount of planning into the initial development of its telecommuting program, which has led to the program's success over the last four years. At the onset of the program, managers and telecommuters went through an extensive training program. During this training and orientation process, many of the "bugs" were worked out, especially those regarding corporate policies and concerns about communication and security. Due to the demand from participants, initial training sessions were held four times a year.

Specific telecommuting policies are strictly enforced. These policies include: posting regular schedules; following a protocol for checking Voice Mail and electronic mail; retrieving messages while telecommuting; and for non-telecommuters, maintaining an office protocol for contacting telecommuters at home. Issues related to internal communications are discussed during departmental meetings.

UNISYS TELECOMMUTING PROGRAM FACTS:

- Program established: 1991
- Number of telecommuters: 90-100
- Primary benefits: key employees retained after closing facility

Unisys is unique.

One of the unique features about the Unisys program is the single point-of-contact approach to setting up new telecommuters. When employees sign up for the program, one call to the Unisys "help desk" gets them started with the connection from home to the mainframe. Technical staff assist employees with setting up modems, maintaining hardware and software and installing computer security programs.

What are the benefits?

The benefits derived from the company's telecommuting program are in the areas of productivity, morale and employee retention. A survey of managers and telecommuters indicates that telecommuters have maintained productivity levels and some have even improved productivity since the program began. "This program makes Unisys a place where people would want to work versus working somewhere else," says Reed.

Reed explained that employee retention is a primary bottom-line benefit brought to Unisys through its telecommuting program. This notion was tested when Unisys closed its Pasadena facility. One option for displaced Pasadena employees was to transfer to the Mission Viejo facility. As a result of Unisys' telecommuting program, many highly skilled programmers stayed with the company because they could forego the longer commute in favor of telecommuting up to three days each week.

Ron King, a computer programmer, is a testament to the success of Unisys' telecommuting program. King has been telecommuting two days a week for the last three years to eliminate the 120 mile drive to and from his main office. This has allowed him more time to spend with his family and accomplish work assignments, not to mention tremendous savings in automobile and fuel expenses. "I am happy not to have to travel on clogged freeways during rush hour, and having extra personal time is much appreciated," says King.

For more information on telecommuting, contact the Southern California Telecommuting Partnership at:

1-800-6INFOHWY (800-646-3649)
Or visit us on the Internet at http://www.sctp.org

SOUTHERN CALIFORNIA TELECOMMUTING PARTNERSHIP

TRW is an international company that provides high-end technology products and services to automotive, space, defense and information industries world wide. TRW's Information Systems and Services Division, based in the City of Orange, is a leading provider of consumer and business credit, direct marketing and real estate information services. This west coast site employs approximately 920 employees.

Because company sales and marketing staff are heavily involved in direct customer contact, it is in TRW's best interest to minimize "office" time and maximize the quality and quantity of service provided to customers. The company sees telecommuting as an opportunity to accomplish this goal. In fact, TRW intends to create formalized, written telecommuting guidelines. However, according to Network Engineer Frank Short, telecommunications programmers and systems employees have been working from home on an informal, or as-needed basis, for the last 10 years.

The Telecommunications Department

In the Telecommunications Department, employees telecommute on a regular basis, usually one day per week. To bridge the communications gap between the home and office, the Department has installed a service that allows telecommuters complete access to the company's entire system of Local Area Networks. Prior to this service, telecommuters were limited to mainframe access only. Now, because telecommuters are connected internally, not only can they access the main corporate network to conduct national and international business, but they can also access external networks such as the Internet. With this external accessibility, employees can communicate via electronic mail with vendors or other business associates.

TRW QUICK FACTS

- Program established: 1989
- Number of telecommuters: 30
- Primary benefits: improved quality and quantity of customer service

Guidelines

Prior to telecommuting, managers and employees discuss departmental rules and agree on expectations while telecommuting. The following are some of the basic guidelines for the telecommuting program:

1) Employees are required to be available during core work hours;
2) An employee's home workspace must be a conducive environment for productive work;
3) TRW will reimburse the employee for the installation of an additional phone line; and
4) In most cases, personal computers and other equipment are purchased by the employee, however, TRW may elect to offset some of the costs associated with the equipment, depending on the circumstances.

What about information security?

Information security is a vital concern for the company. Telecommuters are required to go through several layers of security when they dial into the system. Once in the system, accounts or passwords are needed to go from one network to another. An internal security department continually monitors the system for any type of violation, and regularly "filters" all incoming calls. An Internet network "fire wall" is also in place for additional external system security.

How has the company benefited from telecommuting?

For large employers like TRW, telecommuting is an attractive work option. The South Coast Air Quality Management District (SCAQMD) regulates the amount of mobile and stationary emissions a large employer can produce. Telecommuting has been an effective way to cut emissions and keep employers like TRW in compliance. According to Janis Christensen, manager of fleet and employee transportation, "Telecommuting has contributed to the reduction of emissions produced by our employees."

However, air quality notwithstanding, the company is most pleased with the bottom-line benefits that telecommuting has brought to the Telecommunications Department. Providing a less stressful work environment enables an employee to better concentrate on major projects, which produces better service and higher quality results.

For more information on telecommuting, contact the Southern California Telecommuting Partnership at:

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Or visit us on the Internet at http://www.sctp.org

SOUTHERN CALIFORNIA TELECOMMUTING PARTNERSHIP

The New

B*u*zz

In Business

Movo Media is a small telecommunications/ entertainment firm located in West Hollywood, California. Over the past year, the company has tripled in size and currently employs 30 people. To minimize overhead costs and to allow for flexibility in hiring new employees, the company has made telecommuting an integral part of its operations. In fact, as most employees are allowed to work from home on a full- or part-time basis, at any given time only three to four employees work from the main office.

How does the program work?

Movo Media has not established formal policies for telecommuting. In most cases, each employee negotiates a specific arrangement with his or her manager. "For now, we can handle these issues on an individual basis," explains Movo Media Executive Val Anderson. "However, as we grow, we will begin to adopt formal policies and procedures for telecommuting." Currently, Movo Media evaluates employee equipment needs on a case-by-case basis and reimburses employees for many direct expenses incurred while working from home.

Each employee has clearly defined responsibilities and must decide what work can be effectively performed from home or from the office. "Employees know what has to get done each day and our systems require continual attention," reports Anderson. "It's like a crying baby, if an employee fails to maintain their system, everyone knows about it."

Movo Media Systems Operator Stephen Davis works from home approximately one-third of the time. "Because of the nature of our business, I may need to do work early in the morning or late in the evening. Working from home has allowed me to more effectively manage my schedule to meet both personal and professional needs."

- Program integral to operations
- Number of telecommuters: 30
- Annual cost savings: $30,000
- Key benefit: recruiting top employees

Corporate Benefits

Telecommuting has been an effective tool in recruiting key employees. Movo Media has one employee who lives in San Francisco and two who live in the eastern United States. These employees have expertise that is crucial to the company, but are not willing to relocate to the West Hollywood area. Instead, these employees work from their homes full-time and travel to the West Hollywood office once or twice a month as needed. As an information-driven company, it has been easy to use telecommuting to move the work to the worker, and, in this case, obtain much needed talent regardless of geographic boundaries.

Anderson sums up his program as "greatly successful" in meeting his bottom-line concerns. "Our telecommuting policy has not only given the company the flexibility we need to grow, but it has also saved us over $30,000 a year in overhead expenses."

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Or visit us on the Internet at http://www.sctp.org

SOUTHERN CALIFORNIA TELECOMMUTING PARTNERSHIP

IBM, a world leader in computer technology, uses telecommuting as a business strategy to enhance the quality and delivery of products and services provided to its customers. Nationwide, more than 20,000 IBM employees telecommute regularly.

Approximately 90 percent of IBM's telecommuters are sales and service staff who typically spend more than half of their time away from the office. The other 10 percent are administrative and management staff who telecommute one or two days a week, depending on their type of work and personal needs such as child care.

Sales and Service Telecommuters

IBM has established base offices where telecommuters receive their mail and hold meetings. These base offices typically consist of 8'x8' or 5'x6' cubicles that can be used by any employee needing space on a given day. When an employee is telecommuting, the telephone system is designed to forward calls to an employee's home or another location as necessary.

IBM has equipped each telecommuter with a ThinkPad® laptop computer and pager. Advanced technology, such as portable computers and electronic mail has contributed to a rapid expansion of IBM's telecommuting program.

Telecommuting managers are trained to measure employees by performance objectives. This allows telecommuters to set their own hours, improving accessibility to their customers.

Reactions to Telecommuting

Reactions to IBM's telecommuting program have been positive on all fronts. Employees report a great appreciation for the program, and managers have noticed a remarkable increase in employee productivity and in customer satisfaction. In addition, according to John Boudreaux, program manager media relations, technology such as electronic mail has actually contributed to increased communication between employees and their supervisors.

IBM U.S. – MIDWEST DIVISION QUICK TAKES

- Program established: 1993
- Reduced real estate: 55%
- Annual lease cost and maintenance savings: 60%

IBM U.S. – CRANFORD, NJ QUICK TAKES

- Program established: 1994
- Reduced real estate: 75%
- Annual cost savings: $11 million

IBM CANADA QUICK TAKES

- Program established: 1991
- Reduced real estate: 10%
- Annual cost savings: $4.0 million

The Bottom Line

Boudreaux further explains that because of the scope and nature of IBM's telecommuting program, the company has realized "tens of millions of dollars" saved in real-estate costs.

Another benefit of IBM's telecommuting program is that it assists with disaster preparedness, according to Lee Dudley, external programs manager. More than 80 percent of IBM's Southern California employees telecommute at least one day per week. This level of participation will ensure business continuity in the event of an emergency.

IBM's highly successful program is a direct result of strong enthusiasm and support by management. With such support and the solid personal benefits telecommuting brings to employees, the program is a model for other sales and service-oriented companies.

For more information on telecommuting, contact the Southern California Telecommuting Partnership at:
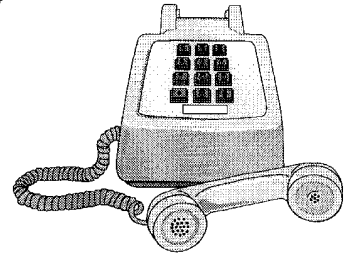
1-800-6INFOHWY (800-646-3649)
Or visit us on the Internet at http://www.sctp.org

SOUTHERN CALIFORNIA TELECOMMUTING PARTNERSHIP

Telecommuting: A Formula for Business Success

Southern California Implementation Manual

Business and organizations are changing and introducing telecommuting and other alternative office strategies. This manual assists organizations to research, put together a successful proposal, plan, and implement telecommuting programs. The manual covers:

- Learning more about telecommuting
- Setting up an in-house telecommuting program
- Writing policy documents

- Selecting telecommuters
- Evaluating your program
- Training your employees and supervisors

Included are telecommuting resources, sample policy documents, related forms—employee and supervisor screening questionaires, before and after surveys, exercises, handouts—as well as ready to use scripted presentation overheads to introduce telecommuting. Questions? Call (213) 922-2811.

Manual Order Form

_____ Quantity @ $16.50 each ($10.00 + 6.50 Shipping) _____ Total

Shipping Name and Address:

_____

_____

_____

_____

_____

Checks only. Write "Telecommuting manual" on check's memo section. Send order form and check, payable to:

Metropolitan Transportation Authority
Telecommuting: A Formula for Business Success Manual
P.O. Box 194, 99-23-2
Los Angeles, CA 90053

APPENDIX B
Case Study 1-Access Project

1   **Title of Project:**
ACCESS project

2   **Contact Person:**

Terry Bills
Project Manager
Southern California Association of
Governments
213-236-1807
email: tbills@ix.netcom.com

3   **Electronic Addresses:** Not available yet.

4   **Application Type:**

Regional Network for the retrieval of government information and communication

5   **Implementing organizations:**

Southern California Association of Governments (SCAG) is the lead agency in implementing ACCESS. Several other agencies assisted in the management and development of the project and representatives from SCAG's jurisdictions assisted with defining system requirements.

6   **Mission:**

SCAG serves as the Metropolitan Planning Organization for the Los Angeles region and as such is responsible for regional planning issues that relate to transportation and air quality, and for the development of the Regional Comprehensive Plan. SCAG's stated mission is: "to enhance the quality of life of all Southern Californians by working in partnership with all levels of government, the business sector, and the community at large to meet regional challenges and to resolve regional differences." (SCAG, 1991)

7   **Date Operational:**

Beginning in January of 1996, those cities already having Internet connection will be able to access the system. In March of 1996, cities will begin receiving hardware necessary to setup system and for connecting to the Internet.

8   **Purpose of the Application:**

Because Southern California Association of Governments is the MPO for the Southern California region, its objectives for the ACCESS project are ultimately regional in nature. The objective of the project is stated by SCAG as being, "to improve communication and cooperation on regional and local issues among jurisdictions within the SCAG region." (page 1, ACCESS project: Project Overview, SCAG, 11/95) Elsewhere it is stated, "The ACCESS project is designed to help facilitate and enrich decision making within the Southern California region. The central goal of the project is to provide information and enabling technology such that Southern California becomes the "most information accessible region in the world."" (page iv, ACCESS project: Jurisdictional Information Booklet, SCAG, 9/17/95) By increasing communication through technology, SCAG hopes to increase participation of SCAG's 190 jurisdictions in regional planning issues such as air quality, transportation and the preparation of a Regional Comprehensive Plan, as well as increasing cooperation and communication between SCAG's jurisdictions.

9   **Description of Users:**

◆ All of the 190 member jurisdictions within the SCAG region will receive computer systems that will allow them to access databases and to communicate with one another through Internet connections. The primary users within each jurisdiction will be city planners who will be provided GIS applications and other types of information sharing programs.

◆ Other users will include transportation planning agencies, economic development agencies, university planning and geography departments, and environmental planning agencies.

◆ A third category of users will be the general public who will be able to obtain information posted on city home pages, communicate with city officials and departments via email and to access city-sponsored newsgroups.

10   **Number of Users:**

There are 190 member jurisdictions within the SCAG region.

11 **Total Potential Users in Southern California:**

There are 16 million people living within the SCAG region who are potential users of the Internet.

12 **Application Accomplishments:**

The application has not been completely implemented as yet. The computer systems for the jurisdictions are in the process of being procured, and the SCAG server computer is soon to be delivered to the agency.

Most of the applications accomplishments to date have come about in the planning and design stages of the project. With the help of local planners, SCAG has facilitated the development of GIS applications for use with the computer systems that are being provided to the jurisdictions by mid 1996. These GIS applications are designed to work specifically with data provided by SCAG.

The system packages have been put together by SCAG so each jurisdiction will receive standardized computer systems and applications so that the sharing of information among jurisdictions will be made easier.

SCAG has also developed a comprehensive training program for the jurisdictions to instruct them in the use of the computers, the GIS applications and the Internet.

13 **Mobility Impacts:**

Mobility impact information can be broken into two general categories:

1. Intergovernment information exchange - Information is shared between SCAG jurisdictions. Through the use of file transfer capabilities and email, each city may share reports, meeting agendas, maps and databases electronically rather than physically making trips to obtain that type of information. SCAG also will have the ability to share information with the jurisdictions, including databases updates, transportation and air quality modeling output and information on pertinent grant programs.

2. Public access to government information and services -

    a. on-line permitting - SCAG has developed an on-line permitting template that is displayed on the City of Alhambra's home page.

It is not operational yet but serves to show cities in the region how they may use the Internet connection to improve city services. This type of electronic transaction allows customers with Internet connection the ability to access information on permits, apply for permits on line and to track permit progress. Electronic permitting may substitute for trips made for the purpose of obtaining permits from city hall.

    b. Information such as public meeting agendas, public meeting notification, reports and maps will be made available on line by member cities. Anyone with an Internet connection will be able to access this information electronically eliminating the need for some trips to be made to city hall.

14 **Quantification of Mobility Impacts:**

15 **Technology Overview:**

Each member jurisdiction will receive from SCAG:

◆ Hardware: standalone computer systems which include personal computers, modem, and communications cards for dial-up and ISDN modem connections.

◆ Software: ArcView 2 GIS package, software for Internet connectivity and an office software package (ex. Microsoft Office) and Netscape, a software for World Wide Web (WWW) access

◆ Home page setup and design for each city

◆ Geographic databases

◆ Internet connection, email, news group development, WWW home page support, and file transfer capability

The jurisdictions will be expected to have subscribed to:

◆ Thomas Brothers digital database

SCAG, or a contractor chosen by SCAG, will maintain the network's UNIX server.

16 **Technology Vendors and Technical Assistance Providers:**

◆ Environmental Systems Research Institute (ERSI) - contracted to provide training program and GIS consulting.

- ◆ PSOMAS and Associates - contracted to provide project management and technology design.
- ◆ GIS Technology Inc. - GIS applications development.
- ◆ Gatekeeper Systems - network applications design and development.
- ◆ Phil Naeker Consulting - maintain server (at present time)

17 Facility Location:

The ACCESS network server will be located at SCAG's offices in downtown Los Angeles. Each member jurisdiction will have a computer system delivered to their city offices.

18 Facility Location Change Associated with the Project:

None

19 Block Diagram:

(See attached.)

20 Costs:

Costs for network members are estimated at $600 per year for network connections and an additional $500 per year for access to the Thomas Brother's database.

Cost for the system design, software development, hardware, training and licenses is approximately $1.4 million.

21 Sources of Funds:

SCAG has received funds for the project from Federal Transit Authority (FTA), Federal Highway Administration (FHWA) and TDA planning. The subregions have received funds from FTA and FHWA.

22 Economic Indicators:

There are several SCAG staff members working on the ACCESS project. PSOMAS and Associates has been hired as a contractor to provide project management and user training and support.

23 Market Size:

The potential market includes all motorists, transit users, public transportation agencies, cities and counties within the Southern California Priority Corridor.

24 Issues and Barriers:

The task of implementing the ACCESS project in a large region with many jurisdictions could be considered a major barrier to implementation. Within the SCAG region, there are 13 subregions and 190 jurisdictions. Consequently, this involves organizing and coordinating installation of 190 systems in each jurisdiction and acquainting the users with its operation. In order to solve this problem, 13 Technical Advisory Committees (TACs) will be formed "to facilitate the implementation within the jurisdictions." (Sec. 1-p. 1, "ACCESS project: Jurisdictional Information Booklet," 9/17/95) Each TAC will be made up of a rep from each jurisdiction and a TAC coordinator meeting on a regular basis to coordinate installation of the systems. The meetings are also intended to encourage information exchange and to facilitate responsibility for implementation to these groups rather than SCAG. SCAG serves in a supporting role.

References:
1. "ACCESS project: Project Overview," Southern California Association of Governments, 8/95.
2. "ACCESS project: Jurisdictional Information Booklet," Southern California Association of Governments, 8/95.

Case Study 2-Antelope Valley Child Abuse Network

1   **Title of Project:**

Antelope Valley Child Abuse Network

2   **Contact Person:**

Dr. Fred George
Executive Director USC-ABC
USC School of Medicine
1537 Norfolk Street, DE 15104
Los Angeles, CA 90033-4615

3   **Electronic Addresses:**

World Wide Web: http://usc-abc3.hsc.usc.edu

4   **Application Type:**

telemedicine

5   **Implementing organizations:**

University of Southern California advanced Biotechnical Consortium (USC-ABC),USC Advanced BioTelcommunications and BioInformatics Center (ABBC), and Los Angeles County Department of Health Services

6   **Mission:**

The mission of the USC-ABC is described as being to improve patient care through the use of new telemedicine technologies. USC-ABC plans to accomplish this goal by bringing together industry and the medical community to develop technologies that focus on improving medical information exchange using "high-performance computing and communications." (The Consortium, winter 1994)

7   **Date Operational:**

1994

8   **Purpose of the Application:**

The purpose of this application is described as : to use advanced telecommunications technology to improve medical care for children in a rural area who may have been abused.

9   **Description of Users:**

physicians, child abuse specialists, law enforcement personnel, social services personnel

10   **Number of Users:**

Not available

11   **Total Potential Users in Southern California:**

Not available

12   **Application Accomplishments:**

The Antelope Valley Child Abuse Network is serving as a demonstration project for USC-ABC and the USC Advanced BioTelecommunications and BioInfomaticsCenter (ABBC). The Network connects the LAC+USC Medical Center's Center for the Vulnerable Child/Suspected Child Abuse and Neglect Program in East Los Angeles - a highly regarded child abus ogram - with a hospital in rural Antelope Valley for the purpose of improving care for child abuse victims in a remote community.The Network allows physicians to consult more quickly in real-time over urgent child abuse cases. The USC-ABCand USC-ABBC are seeking through this project to evaluate the cost effectiveness of telemedicine.

13   **Events leading to Mobility Impacts:**

Distance barriers are overcome by the Network that would otherwise prevent immediate care for abused children.The network allows physicians, children and their families, and law enforcement and social service personnel to avoid travel. Without telemedicine, the trauma specialist or the child and family must travel long distances, 75miles one way, for the child to be examined. The Network allows physicians at the High Desert Hospital to immediately consult with a specialist at the Center for the Vulnerable Child in real time through the use of medical images sent over the Network. Using the Network allows the specialist to consult at a distance without actually being in the room with the child and the physician. The Network makes possible quicker identifict child abusers and ruling out of those who are not. In this way, the Network saves time and trips for law enforcement and social service personnel.

14   **Quantification of Mobility Impacts:**

No

15   **Technology Overview:**

The Network provides a high-speed multimodal connection for medical consultation between the Antelope ValleyHospital and LAC+USC Medical Center. Medical information such as color images

of the patient's external injuries and x-ray images are transferred over ISDN lines between the Center for the Vulnerable Child/Suspected Child Abuse and Neglect Program at the LAC+USC Medical Center and the Antelope Valley Hospital. USC's Biomedical ATMNet connects the LAC+USC Medical Center to USC and a JPL supercomputer located at Caltech. The JPL supercomputer pro- vides"3-D volumetric visualization" capability. The consulting physicians are able to review per- tinent medical information in real-time over these networks.

The technology equipment, connections and applications used for the ATMNet are as follows:

◆ Supercomputer: Cray, Thinking Machines

◆ Network connection: ATM Cell Relay at 155 Mbps (OC3c) provided by Pacific Bell

◆ Terminals and workstations: Sun SPARC 20/51MSX, IBM RS/6000, Apple Power PCs

◆ Image servers: IBM RS/6000s

◆ Applications: 3-D visualization, videoconfer- encing, clinical information systems, radiology imaging.

16 Technology Vendors and Technical Assistance Providers:

JPL	Sprint
Northrop Grumman	Loma Linda University
Hughes	Advanced Visual Systems (AVD)
All Star Telecom	
Pacific Bell	USC
Apple Computer	IBM
CEMAX	Sun Microsystems
Eastman Kodak	Cisco Systems
Fore Systems	General DataComm
GTE	Knobbe, Martens, Olson and Bear
Langdon Wilson	
Picker International	Newbridge
AT&T	Syn Optics

17 Facility Location:

The Center for the Vulnerable Child is located at the USC+LAC Medical Center in East Los Angeles and the HighDesert Hospital is located in the City of Antelope Valley. The supercomputer is located at JPL's SupercomputerCenter at Caltech.

18 Facility Location Change Associated with this Project:

19 Application diagram:

(See attached.)

20 Sources of Funds:

USC-ABC received a $1.6M Pacific Bell CalREN grant for network connections and $1M for the State of CaliforniaOffice of Strategic Technology and Eastman Kodak. Pacific Bell is also providing a .5FTE for the child abuse program and USC is providing a .5FTE administrator for the program.

Cost for the system design, software develop- ment, hardware, training and licenses is approxi- mately $1.4 million.

21 Economic Indicators:

One of the purposes of the Antelope Valley Child Abuse Network as a demonstration project is to evaluate the cost of telemedicine compared to the cost of conventional care. The USC-ABC and USC-ABBC are studying the costs of medical care in this program and comparing them with conven- tional care at another remote site. Another eco- nomic advantage to this type of telemedicine is that the time available for specialist physicians to consult is increased making it possible to reach more
children in a larger geographic area. It is expected that the cost savings with the use of advanced telecommunications technologies in this program are significant.

22 Market Size:

Not available

23 Issues and Barriers:

The technical issues that USC's Biomedical ATMNet sought to overcome relate to the quality and resolution of images used in remote diagno- sis. Previously the medical images Lacked the quality required for remote diagnosis for this type of urgent care. The ATM network greatly enhanced the quality of medical images and allowed for use of three-dimensional images by consulting physicians. At speeds of up to 155Mbps, ATMNet allows physicians to consult in real-time using 3-D

medical images, or what is referred to as volumetric visualization.

The Antelope Valley Child Abuse Network also sought to overcome distance barriers that prevented abused children from receiving immediate medical diagnosis and care from experts in the field. The remote High Desert Hospital in Antelope Valley is connected by the ISDN lines to experts 75 miles away at the LAC+USC Medical Center's Center for the Vulnerable Child/Suspected Child Abuse.

References:
1. Alvey, C. et al. "Cost-Reducing Health Care Technologies: Telemedicine and the Vulnerable Child." October, 1994, published onhttp://use-abc3.hsc.usc.edu.
2. George, F. "Re-Inventing Health Care Delivery via Telemedicine," Nov. 1994, http://usc-abc3.hsc.usc.edu
3. "California Research and Education Network (CalREN) Supports USC's Advanced Biomedical ATMNet," 1994, Pacific Bell.

Case Study 3-Davis Community Network

1 **Title of Project:**

Davis Community Network (DCN)

2 **Contact Person:**

Vicki Suter
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PO Box 1563
D(95617
vnsuter@ucdavis.edu

3 **Electronic Addresses:**

City of Davis home page address:
http://www.city.davis.ca.us/

Davis Community Network:
http://www.dcn.davis.ca.us/DCN

4 **Application Type:**

Community Network

5 **Implementing organizations:**

City of Davis, University of California at Davis,
California Department of Transportation, local
businesses, the Davis Chamber of Commerce,
Davis school district, a local newspaper, the
county library, the community television station,
KVIE-TV 6 (public-access cable tv) and members
of the community.

6 **Mission:**

The mission of the Davis Community Network is
stated as being "to strengthen the community by
providing Internet-based communication, infor-
mation services and support in order to help its
citizens make better decisions, participate in
decisions affecting their lives and obtain all the
benefits of full participation in the emerging
electronic community." (DCN, May 29, 1995)

7 **Date Operational:**

DCN was brought on line for testing by the "Davis
First 50" in May, 1994. The Davis First Fifty are
community members who served as the initial
pilot group for network evaluation.

8 **Purpose of the Application:**

(See mission statement.)

9 **Description of Users:**

Citizens and businesses in the Davis Community
are the main targeted users of the network.
Because the network is on the Internet, anyone
with an Internet connection can access the DCN
on-line services.

10 **Number of Users:**

The Davis Community Network home page aver-
ages over 3000 accesses per day. (DCN, 1995) The
"Davis Virtual Market" was accessed over 73,000
times during October, 1995. (DCN, 1995) As of
November 20, 1995, 1035 subscribers were listed
by the network.

11 **Total Potential Users in Southern California:**

The total potential users in the Southern
California region would be all those people who
had an Internet connection and an interest in
accessing the information provided by the DCN.

12 **Application Accomplishments:**

The DCN provides on-line access to local
government, on-line businesses and access to
on-line community events information, communi-
ty connections via the Internet, email, bulletin
board access, and access to newsgroups and
mail lists.

13 **Events Leading to Mobility Impacts:**

The areas in which the DCN may affect travel
demand include, but are not limited to:

1. Telebusiness and teleshopping - DCN sub-
scribers may shop on line from their homes. DCN
has created the Davis Virtual Market, an on-line
market featuring businesses in the community.
Included on the Virtual Market home page are
listing of restaurants, professional services, orga-
nizations, technology vendors and other small
businesses in the community. The listing of prod-
ucts and menus allows for comparison shopping
by subscribers which may eliminate the need for
those types of trips. Davis Food Coop teleshop-
ping project plans future use of electric vehicles
for delivery of goods. There are also plans for the
provision of forms pages which would allow sub-
scribers to order over the network.

2. Telegovernment - DCN subscribers have access to government information and services replacing trips to city hall. At the present time, the Davis Electronic City Hall provides listings of employment opportunities and city government information such as meeting minutes and agendas. These on-line services would eliminate trips to the city hall because people would have access to them on their computers at home or at their place of business. The DCN plans to have on-line business and employment application prototypes by June 1996, and downloadable forms for all city permits and applications in the future.

3. Telecommunity - DCN subscribers can access and post community events from the Community Calendar web page, which allows people in the community access to information on community events on-line rather than traveling to the community events office.

14   Quantification of Mobility Impacts:

In process at the Institute for Transportation Studies at University of California Davis with Pat Mokhtarian as principle investigator. (See http://www.engr.ucdavis.edu/~its/telecom/ for more information.)

15   Technology Overview:

DCN operates and maintains the network which provides subscribers with access to newsgroups, email, bulletin boards, mail lists and the Internet with WWW access.

Network connection technology provided by or to be provided by DCN includes modems, ISDN, ATM and CATV. At present, in addition to POT (plain old telephone) modem connections, DCN has recently begun offering ISDN connections. As of February 1996, only "dedicated" ISDN connections were being offered. Testing is in the process of being conducted by the DCN on "contended" ISDN lines, which multiple users share one ISDN connection.

Small scale tests are being conducted on the use of wireless and CATV technology. Research on wireless is concentrating on the "mobile worker" and the "office of the future" (DCN, 2/21/96, email) and testing different levels of connectivity: "wireless portable docking, wireless LANs, wireless building-wide networks (e.g. the library),

wireless MANs ... and wireless wide area networks ... ." (DCN, 2/28/96, email)

Technical Equipment:

UNIX SPARC 10 (donated by SUN Microsystems): 32 mb of memory, 2.1 gigabytes storage, and a tape backup unit.

SPARC1 (donated by UCD) with 16 mb memory, 2 internal 1.2 gb hard disks. WWW user interface (LYNX and Mosaic)

Mac IIci for user support (on loan from UCD)

16   Technology Vendors and Technical Assistance Providers:

◆ Davis Community Television (DCTV) - sub contracted to provide training, community outreach, marketing, and account management.

◆ American Cabling and Communication (AC&C) - subcontractor providing low-cost modem services, assists University in evaluation of network technologies and negotiates for loans and equipment donation.

◆ InterNIC - provides domain space.

◆ QualComm

◆ BARRNet/BBN

◆ Sun Microsystems

◆ California Department of Transportation

◆ University of California at Davis

◆ Tetherless Access Ltd.

17   Facility Location:

The DCN staff offices and Davis Community Television are located at 1623 Fifth Street, Suite B, Davis, California 95616.

DCN network computers are housed at the computing center at the UCD campus.

18   Facility Location Change Associated with this Project:

In 1994, it was decided to move the location of the network offices and transfer control from the University of California at Davis to the Davis Community Network.

19   Block Diagram of Application:

(See attached.)

20 Costs:

Subscribers fees for DCN connection amount to between $15 - $180 per month (as of 11/95) depending on type of account. The least expensive are individual and family accounts with 14,400 or 28,800 modems. Other types of accounts include multiple-user, dedicated line and ISDN. ISDN connections cost up to $290 per month. A DCN home page costs $100 a month for the connection.

21 Sources of Funds:

DCN received a CALTRANS three-year research grant of $500,000 and 20 percent match from University of California at Davis. The DCN also received part of a NTIA grant award which DCN jointly applied for with other members of a 15-county regional network.

City of Davis provided approximately $23,000 for the test pilot project for providing on-line city information. The City also provided DCN a loan of approximately $32,000 in start-up funds.

DCN staff is currently seeking other grants.

DCN is also supported by volunteers, amounting to approximately 500 hours a month, (DCN, 11/95) and equipment donations.

22 Economic Indicators:

UCD provides .20 FTE staff supported by the Caltrans grant money and matching UCD funds.

DCN has a paid staff of nine employees totaling 3.85 FTE. Volunteers represent 3.5 FTE.

Goods and services have been purchased by DCN from Davis Community Television and American Cabling and Communication. The dollar amount from these vendors is unknown at present.

The Davis Virtual Market (DVM) (http://www.dcn.davis.ca.us/DME/), a part of the DCN, is a "webpresence" company which provides Web pages for businesses and individuals. The DVM helps to promote business on the Internet. For example, "Pizza Day" is sponsored each month on the DVM where contests and promotions help to increase traffic to the pizza parlors advertising there.

The DCN offers a number of success stories of businesses who have established a presence on the DVM. A local comic book store had been a

storefront operation before taking part on the DVM. After obtaining a presence on the Web, the store now has a mail order operation, sells space on its website to other businesses, and is representing other game and publishing companies, both U.S. and foreign on their Web site. Another example is that of a mail-order computer business that increased its business through a Web site with on-line forms and ordering.

23 Market Size:

24 Issues and Barriers:

Because of initial uncertainty over technology options, several pilot projects were conducted to evaluate the effectiveness of the network, including the initial pilot projects and one to evaluate the provision of city information over the network. DCN is in the process of working towards an Electronic City Hall and presently offers a variety of city services over the network. City departments listed on the Davis City Government home page are:

◆ Administrative Services
◆ City Council
◆ Fire
◆ Parks and Community Services
◆ Public Works
◆ General Plans Committees
◆ Financial.

DCN is continuing to research and seek out grant money for continuing operating expenses and development.

DCN is at present working on legal issues that deal with the security of providing on-line applications for employment and business license applications.

Other barriers encountered by DCN relate to ISDN tariffs and PUC regulatory activities.

References:
1. Davis Community Network on-line information, http://www.city.davis.ca.us/ http://www.dcn.davis.ca.us/DCN
2. information provided by email from Julie Cross and Vicki Suter of the DCN

Case Study 4-Southern California Intelligent Transportation Systems (ITS) Priority Corridor

(NOTE: The ITS Priority Corridor showcases a group of telecommunications applications that indirectly affect travel behavior by providing information about the condition of traffic on the highways. Intelligent Transportation Systems are not within the scope of the Telecommunications Cluster, but this document is included for reference.)

1 **Title of Project:**

Southern California Intelligent Transportation Systems (ITS) Priority Corridor

2 **Contact Person:**

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3 **Electronic Addresses:**

Showcase Web:
http: //www.anatcp.rockwell.com/showcase/

4 **Application Type:**

Intelligent Transportation Systems (ITS) - This term covers a broad range of information technologies designed to improve traffic efficiency on the infrastructure.

5 **Implementing organizations:**

Federal Highway Administration (FHWA), Federal Transit Administration (FTA), California Department of Transportation (Caltrans), California Highway Patrol, Southern California Association of Governments, South Coast Air Quality Management District, Los Angeles Metropolitan Transportation Authority, Orange County Transportation Commission, the cities of Los Angeles, Irvine and San Diego, San Bernardino Association of Governments, Riverside County Transportation Commission, San Diego Association of Governments, Private Sector Organizations (e.g. Automobile Companies, Traffic Conditions on Radio and Television)

6 **Mission:**

The mission of the Southern California ITS Priority Corridor Steering Committee is stated as being "to provide a forum for the development of the Southern California ITS Priority Corridor Strategic Deployment Plan and Showcase Project (Corridor Plan) for deployment of Intelligent Transportation Systems in the Southern California ITS Priority Corridor.

7 **Date Operational:**

On March 29, 1993, the FHWA identified the Southern California ITS Priority Corridor as one of four areas in the United States that would showcase and deploy ITS technology.

The first generation operations, the Field Operational Tests (FOTs), began in 1994 and 1995 and are expected to be completed in 1996. The studies for development of Strategic Deployment Plans for each region within the Corridor and one Corridor-wide study are beginning in early 1996. One exception, the San Diego study, which began in August, 1995.

8 **Purpose of the Application:**

The Southern California Priority Corridor was established by Congress to showcase and to bring about deployment of ITS technologies with the goals of improving mobility and traffic safety on the roads, strengthening the economy, and reducing energy demands and environmental impacts.

9 **Description of Users:**

Cities and counties in Southern California, public transportation agencies, and law enforcement agencies will use ITS technologies to improve traffic flow on streets and freeways, inform drivers about traffic conditions, collect traffic data, report potential traffic problems and deploy crews for rapid clearance of incidents causing congestion.

Motorists and transit riders will use the ITS technologies to obtain up-to-the-minute traffic information.

10 **Number of Users:**

Motorists and transit users in Southern California

11 **Total Potential Users in Southern California:**

All Southern California cities, counties, law enforcement agencies, transportation agencies, public and private transit companies, motorists, and transit riders within the Priority Corridor.

12 **Application Accomplishments:**

The main objective of the Priority Corridor is the deployment of ITS technologies in the Southern California area. There are several major efforts now under way within the Corridor towards this objective. These efforts are in the form of studies to develop deployment strategies, and in the form of actual projects. There are studies being conducted to develop ITS deployment plans, one for each of four regions in the Corridor and one overall Corridor deployment plan.

Projects include:

◆ Showcase Project - The purpose of this project is to demonstrate a major intermodal transportation management and information system within the Corridor. This project involves two phases: the scoping phase to be completed in October 1996 and the high level design phase.

◆ Early Start projects - A part of the larger Showcase Project, these projects are directed at early deployment of ITS technologies in order to demonstrate to the public and stakeholders their value to the ITS program and to refine the technologies. The projects that have received federal funding are:

  • Travel Tip - This Orange County Corridor project is expected to demonstrate an Advanced Travel Information System that can be linked to the corridor and a prototype that can be deployed in the other parts of the corridor.

  • CAD/Voice Three-Way Emergency Dispatch Interface (San Diego)

  • Jack Murphy Stadium ATIS (San Diego)

The start date for the next six Early Start candidate projects could be 1996. These projects have been selected by the Southern California ITS Corridor Steering Committee as projects that will deploy other types of applications within the Showcase Project. The Steering Committee is presently seeking Federal funding for these projects. These projects are:

• Showcase Kernel - The purpose of the Showcase Kernel is to integrate all the Showcase Projects under one core system. (Corridor Wide)

• Integrated "Modal-Shift Management" System - a traveler information system that will provide real-time transportation information. (Caltrans District 7 and Partners from Los Angeles and Ventura County areas.)

• San Diego Transit Management and Information System - This system would provide real time information to transit planners and dispatchers to improve transit efficiency. (San Diego)

• San Diego Intermodal Transportation Management and Information System prototype architecture for creating a multimodal "Transportation Management System" from the current single-mode Caltrans District 11 Transportation Management Center (TMC). This system is planned to be compatible with other Caltrans District TMCs.

• Inter Regional Rideshare Data Base Linkage - intended to provide a link between SCAG's and SANDAG's rideshare and transit databases, for the purpose of providing this information to travelers and commuters who cross county lines within the Corridor.

• Intermodal and Jurisdictional Integrated Network Environment (IMAJINE) This technology is intended to integrate freeway and arterial street operations in an area in South East Los Angeles County that is heavily traveled and which crosses multiple jurisdictions.

◆ Field Operational Tests:

  • Integrated Ramp Metering/Adaptive Signal Control - an ongoing project designed to balance traffic flow in and around the I-5/I405 area.

  • Mobile Surveillance - an ongoing project located in the city of Irvine involving portable surveillance and detection for highway conditions.

- "Scoot" Adaptive Traffic Control System - an ongoing field test located in Anaheim for adaptive signal timing

- Smart Call Box - another ongoing project located in San Diego designed to collect traffic data

- Spread Spectrum Radio Traffic Interconnect - uses spread radio spectrum technologies to communicate with traffic signals

- HELP (Heavy Vehicle Electronic License Plate) - an ongoing project used for elec tronic clearance of commercial vehicles

◆ California Advanced Testbed - a project slated to begin in early 1996 that will be designed as a cooperative research, evaluation and implementation project designed to operate across jurisdictions in order to better manage traffic and transportation.

◆ Southern California Smart Traveler - an 800 phone number for accessing traveler information throughout Southern California

◆ Smart Corridor - a project, in operation since the 1994 Northridge earthquake, designed to provide real-time transportation information, emergency response and traffic management in the Santa Monica Freeway Corridor.

13 **Events leading to Mobility Impacts:**

ITS allows the existing transportation system to operate more efficiently, without adding new infrastructure. There are two general areas in which ITS technologies accomplish this, these are:

◆ The provision of real-time, interregional traffic and route information within the Corridor to motorists and transit riders so that they can make better travel decisions; and

◆ Managing congestion for better traffic flow through adaptive and coordinated signal timing and ramp metering

14 **Quantification of Mobility Impacts:**

Telecommunications from within the scope of the Strategic Deployment Plan, qualitative analysis of mobility impacts of the first projects are planned. The Southern California Association of Governments may do future quantitative analysis of mobility impacts of ITS and Telecommunication applications and FOTs on a limited scale.

15 **Technology Overview:**

A broad range of technologies are included under the umbrella of ITS. At the present time, the advanced technology efforts within the Southern California Priority Corridor include technologies that would:

◆ Create interregional, multimodal traveler information systems;

◆ Use "Spread Spectrum" radio signals to coordinate traffic signals;

◆ Allow for electronic license plates for commercial vehicles;

◆ Integrate ramp metering and create adaptive signal controls;

◆ Allow electronic collection of traffic data;

◆ Allow for quicker emergency response;

◆ Allow the traveler to access real-time traffic information;

◆ Create a mobile surveillance unit for collection of data on events affecting traffic on the freeways such as accidents and construction projects;

◆ Allow real-time computer-assisted traffic and transportation management and response;

◆ Integrate all ITS technologies on a network system type. and

◆ Create multimodal Travel Management Centers.

16 **Technology Vendors**

Rockwell and NET will design the Showcase Project. Other technology vendors include: Transportation Corridor Consultants; Parsons, Brinckerhoff, Quade and Douglas; Farradyne; JHK Associates; and BRW.

17 **Facility Location:**

Ongoing projects and studies are located throughout the Corridor area, including the cities of Anaheim, Irvine, San Diego and Los

Angeles, and the counties of Los Angeles, Orange, Riverside, San Bernardino and San Diego. Including Caltrans Transportation Management Centers.

18 Facility Location Change Associated with this Project:

Transportation Management Centers: Caltrans, Transit Operators, Cities, Counties.

19 Application Diagram :

To be available in components of the Southern California ITS strategic deployment plans being developed in 1996-1997.

20 Costs:

Approximately $1.8 million has been approved for development of the Strategic Deployment Plan.

Another $92,000 has been approved for the "Early Deployment Plan for North American Commercial Intermodal Transportation System and Intermodal Border Crossing Operations.

The total budget for the FOTS--Integrated Ramp Metering/Adaptive Signal Control, Mobile Surveillance, "Scoot", Smart Call Box, Spread Spectrum Radio, International Border Electronic Clearance and HELP--have been budgeted approx-imately $10.6 million.

The Southern California Smart Traveler project has been budgeted approximately $2 million per year. The total budget for the Smart Traveler is approximately $47 million.

The budget for the Athena project totaled $2.3 million.

The total budget approved for the FOTs is approximately $17 million.

The total cost for all the Early Start projects is $32.69 million of which $21.17 million are federal funds. Cost for each Early Start project is broken down as follows:

- Showcase Kernel - $.990 million (funded)

- Integrated "Modal-Shift Management" System - $1.92 million (federally funded)

- San Diego Transit Management and Information System - $15.7 million ($3.0 federally funded)

- San Diego Intermodal Transportation Management and Information System - $5.625 million ($1.825 federally funded)

- Inter Regional Rideshare Data Base Linkage - $.210 million

- IMAJINE - $6.820 million ($2.4 federally funded)

- CAD/Voice Three-Way Emergency Dispatch Interface - $.750 million (federally funded)

- Jack Murphy Stadium ATIS - $.625 million (federally funded)

21 Sources of Funds:

The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 authorized approximately $250M to be spent in ITS Priority Corridors. State or local governments are expected to provide a 20% match to money they have received. Other private and public monies are being sought.

22 Economic Indicators:

One of the objectives for the ITS Priority Corridors is to improve the economy throughout the region and state by working with private companies to help develop ITS technologies. It is hoped that by showcasing ITS within Priority Corridors, use of the ITS technologies will increase significantly providing benefits to the economy. The Federal government goal is 80% private and 20% public funding.

23 Market Size:

The potential market includes all motorists, transit users, public transportation agencies, cities and counties within the Southern California Priority Corridor.

24 Issues and Barriers:

The establishment of the Priority Corridor created the need for cooperation and coordina-tion among the multiple jurisdictions and private organizations within the Corridor area. The Southern California Priority Corridor Steering Committee was formed to help coordinate and integrate ITS activities within the Corridor so that an interconnected communications system can be developed and traffic flows crossing jurisdictions can be better managed.

Appendix C

Smart Valley, San Diego: City of the Future, and Net at Two Rivers (N2R):

Comparisons of Existing Regional Telecommunications Efforts Within the State of California

California

Regional Telecommunications Project Comparisons

Outline

1. **Mission —** statement; motivations/objectives

2. **Perceived Benefits —** assoc. w/electronic community

3. **Initiation —** developmental catalyst; organizing partners

4. **Composition —** membership of committees, subcommittees

5. **Major Goals —** broad

6. **Funding —** organizing group, projects

7. **Fund Raising —** organizing group, projects

8. **Organization and Accomplishments —** structural framework of components, functions, initiatives/projects/recommendations per component

9. **Outreach Efforts**

10. **Current Status**

Smart Valley: San Francisco Bay Area

Smart Valley was established in 1993 as a 501 (c)(6) non-profit organization for the purpose of developing advanced information infrastructure for the nine counties in the San Francisco Bay Area. (See also: www.svi.org).

1 MISSION

◆ Serve as a broker between technology providers, service providers, application developers and end users so as to facilitate delivery of real-world benefits of a regional information infrastructure.

◆ Utilize the regional information infrastructure to enhance global competitiveness, ensure balanced economic growth, and increase the quality of life.

◆ Assist the region in becoming a leader/role model for global implementation of information technologies.

2 PERCEIVED BENEFITS

Benefits from development of the Smart Valley electronic community are expected to:

◆ revitalize education

◆ reduce costs and increase quality of healthcare

◆ make local government more responsive

◆ keep business in the area

◆ create jobs

3 INITIATION

Assembled in 1993 by the Joint Venture: Silicon Valley (JV:SV), a network composed of representatives from business, local government, academia, and the community that is committed to creation of high-value jobs, a strong economic foundation, and a better future for all people and businesses. In June 1992, the JV:SV arose to address the need for a community-wide public/private regional effort toward developing and applying information infrastructure technologies. JV:SV continues to focus on economic development education by: working to retain, expand and attract businesses, streamline the regulatory process, support entre-

preneurial start-ups, promote defense transition, identify export opportunities, and address tax and fiscal issues. JV:SV also continues to assist in providing expertise on community priorities.

4 COMPOSITION

Smart Valley is comprised of more than 100 representatives from approximately 70 companies, government entities, and educational institutions. The corporate membership includes: telephone, cable, computer, software, internet, and telecommunications firms; information, management, and engineering consultants; and legal, defense, banking, financial, medical, petroleum, and electrical utility representatives. Government participants range from local to congressional members.

Smart Valley is a legally and financially independent organization with its own board of directors. While the JV:SV was instrumental in increasing the visibility and creating support for Smart Valley during its inception, now the JV:SV acts as a working partner to develop economic vitality in the Bay Area. Smart Valley and JV:SV coordinate fund raising campaigns. Smart Valley benefits from JV:SV's organizational resources and network relationships.

5 MAJOR GOALS

◆ Build awareness of the potential for new information technologies and services in the community.

◆ Work with providers to develop a communications technology and information services road map and strategy.

◆ Assist grassroots efforts to identify and implement a diverse set of applications.

◆ Drive a few, selected, focused projects to demonstrate the value of the infrastructure.

◆ Work with state and local agencies to resolve public policy issues that affect the implementation and management of the information infrastructure.

◆ Develop a governance structure that reflects strong ties to the Joint Venture: Silicon Valley network and to the community.

6 FUNDING

Smart Valley costs of operation are covered by membership fees (that vary by type of organiza-

tion and revenue size), and donations of people and products from businesses and other organizations. Collected funds are used for office operations, staff salaries and benefits, meetings, etc. Smart Valley does not receive government funds to support the organization at this time.

7 FUND RAISING

◆ Smart Valley and JV:SV coordinate fund raising campaigns to champion flagship projects and initiatives.

◆ Smart Valley 's specific projects often receive government funding for research or implementation.

◆ Charitable donations from individuals are gathered via the "Smart Valley Charitable Fund" at the Community Foundation of Santa Clara County and the Peninsula Community Foundation (both 501(c)(3) organizations). These funds are utilized to support the goals of Smart Valley, ie. support for school, and other projects, not Smart Valley operations.

8 OPERATIONS AND ACCOMPLISHMENTS

Figure 1 provides a schematic of the structural development of Smart Valley. The Smart Valley originates with the JV:SV initiative and continues to expand via projects assisted by the Smart Valley Board of Directors and its program committees.

A. Smart Valley Board of Directors

The Smart Valley Board of Directors is comprised of 15 members that represent telecommunication and computer businesses, education, medicine, and government. This Board has a variety of responsibilities that span from selecting its membership to setting its budget. The Board has four standing committees: development and finance, audit, compensation, and nominating and search. Each standing committee has specific duties.

The Board designed six program committees: education, government community and non-profits, healthcare, commerce and international, telecommuting and technology. Each program committee contains a Board member and additional members with comprehensive expertise in their sector that: report to the Board on flagship and grassroots projects, identify and screen potential new projects and champion flagship projects. Smart Valley's business plan provides

the organizing principles for selection of such projects.

Smart Valley's business plan states that the criteria for choosing pilot projects is:

◆ emphasis on real values and practical results,

◆ focus on strategic sectors: education, healthcare, government access, government services, commerce, community, and non-profit organizations,

◆ commitment and management skills necessary to deliver results on schedule,

◆ demand-driven orientation, by user needs and orientation, and

◆ lasting institutional effect on the Bay Area.

In addition, Smart Valley projects are required to have most of the following attributes in order to be selected:

◆ regional orientation

◆ collaborative involvement

◆ organizational or political barrier reduction

◆ advanced networking capabilities and/or applications

◆ innovation and suitable risk

◆ standards utilization (or open creation of new standards)

◆ scaleability to larger implementation

◆ strong component of public benefit

(Characteristics of projects that are less likely to receive support are also stipulated.)

Supported projects may receive one or more of the following support elements from Smart Valley:

◆ technical and business expertise

◆ networking, ie. location of suitable partners

◆ financial or equipment resources

◆ access to smart valley volunteers

◆ support letters for grant making

◆ assistance in grant writing

◆ visibility and public relations

B. Smart Valley Program Committees

Each member of the Board of Directors is responsible for providing organizational direction by serving on a project subcommittee in the following areas: education; healthcare; government, community and non-profits; commerce and international; telecommuting; or technology. The most significant ongoing projects associated with each program committee are listed below.

Education Program Committee

Smart Schools Project
Nueva School

Commerce and International Program Committee

BADGER
CommerceNet
Japan Windows

Government, Community and Non-Profits Committee

PAN
abagOnline
SV-PAL
Plugged-In

Telecommuting Committee

Telecommuting Project

Healthcare Committee

BACHEN

Technology Committee

BATMA
CalRen

9 **OUTREACH EFFORTS**

◆ Direct face-to-face meetings
◆ Newsletter
◆ Breakfast talks = "Smart Talks"
◆ 6 Conferences
◆ Editorials
◆ Annual membership meeting
◆ On-line services
◆ Fundraisers
◆ White House interactions
◆ Prepared comments for Ca PUC
◆ Assisted in development of pilot projects

10 **CURRENT STATUS**

Ongoing work to improve the performance of Smart Valley in achieving its mission at all levels of the organization. Expanded involvement of community members in assisting to develop new project initiative.
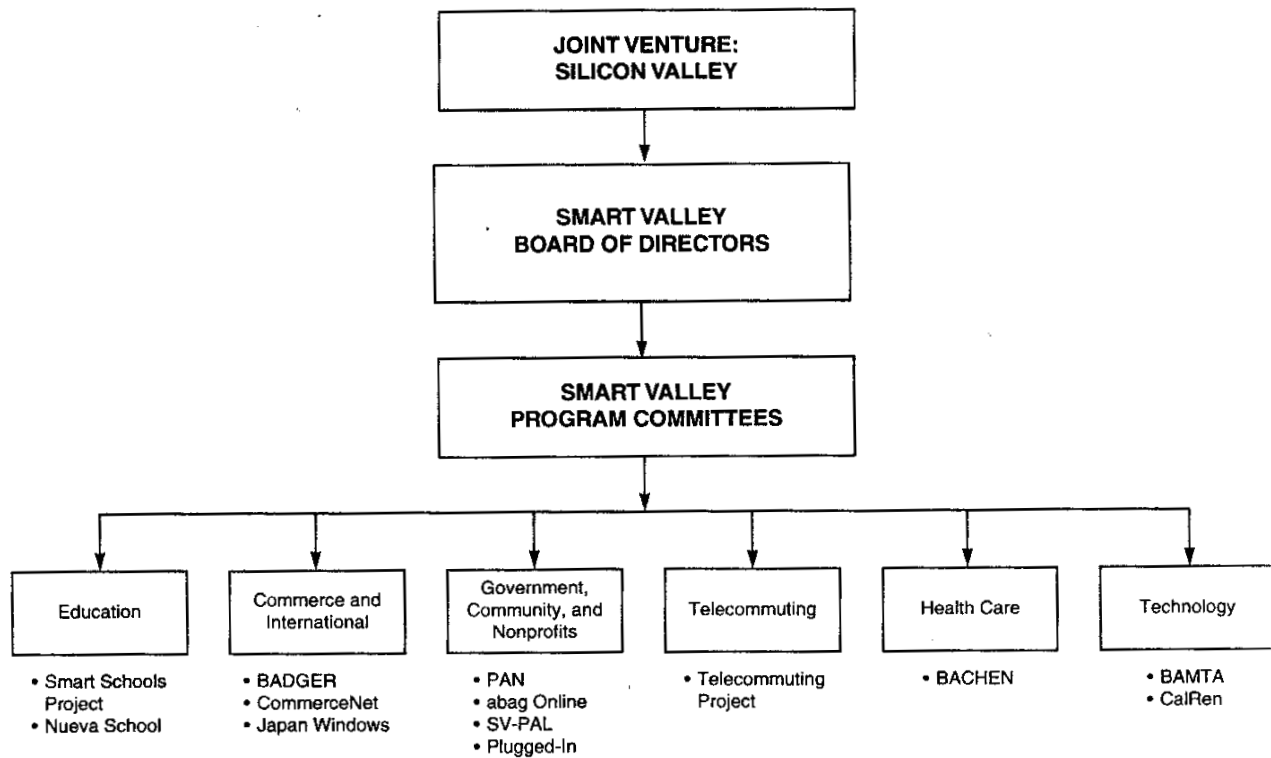
Figure 1
Smart Valley: Organizational Structure

```
                    ┌─────────────────────────┐
                    │     JOINT VENTURE:      │
                    │     SILICON VALLEY      │
                    └─────────────────────────┘
                                 │
                                 ▼
                    ┌─────────────────────────┐
                    │      SMART VALLEY       │
                    │   BOARD OF DIRECTORS    │
                    └─────────────────────────┘
                                 │
                                 ▼
                    ┌─────────────────────────┐
                    │      SMART VALLEY       │
                    │   PROGRAM COMMITTEES    │
                    └─────────────────────────┘
                                 │
```

Education	Commerce and International	Government, Community, and Nonprofits	Telecommuting	Health Care	Technology
• Smart Schools Project • Nueva School	• BADGER • CommerceNet • Japan Windows	• PAN • abag Online • SV-PAL • Plugged-In	• Telecommuting Project	• BACHEN	• BAMTA • CalRen

San Diego: City of the Future

The "San Diego: City of the Future" initiative was developed via a Mayor's Advisory Committee, and the subsequent subcommittees which were formed to evaluate San Diego's potential as a telecommunications center of the new North American Common Market at Mayor Susan Golding's request.

1 **MISSION**

The Mayor's Advisory Group on the City of the Future was requested to hasten and facilitate the development of a new industry and government cooperative and to build widespread community awareness for the concept of the city of tomorrow, today.

2 **PERCEIVED BENEFITS**

Benefits from development of a community-wide information infrastructure are expected to assist San Diego's growth and prosperity by:

◆ establishing it as world-class city of knowledge

◆ developing and using information pertinent to its economic base, research base, and geographic position on two borders: the Pacific Rim, and Mexico

◆ providing high-speed communications capability to support local and worldwide access to other communities and knowledge resources

3 **INITIATION**

Mayor Susan Golding created the Mayor's Advisory Committee (MAC) for the "City of the Future" project in April, 1993. The mission of the MAC, stated above, reflects the exploratory nature of this effort as well as directive for developing public/private telecommunications cooperatives and public awareness of the Committee's recommendations.

4 **COMPOSITION**

The MAC is composed of approximately 30 representatives from cable, communication, television and telephone companies, military surveillance/communications, local and county government, school districts, community colleges and public and private universities, super-computer resource centers, utility companies, banking institutions, computer and computer network companies, convention/tourist bureaus, medical centers, telecommunications centers, and community members.The MAC was divided into two components from its inception: a technical committee and a policy committee.

5 **MAJOR GOALS**

◆ Examine the importance of information technology in San Diego.

◆ Evaluate San Diego's readiness for such a vision.

◆ Recommend steps to be taken to hasten and facilitate the development of a new industry and government cooperative.

◆ Build widespread community awareness for the concept of a city of the future.

6 **FUNDING**

There is no specific mention in the report regarding funding of the initiative. It is assumed that the Mayor's office and the City of San Diego financed production of meeting materials and communications, and provided meeting rooms for a majority of the MAC and subcommittees meetings.

7 **FUND RAISING**

At the June 3rd MAC meeting a committee member provided a brief report on state and federal funding for information infrastructure investment. A suggestion was made to develop a subcommittee to review state and federal funding opportunities, solicit proposals and coordinate them through the Mayor's office. It appears that subcommittees often provided suggestions regarding funding opportunities in their final reports.

8 **OPERATIONS AND ACCOMPLISHMENTS**

Figure 2 is a schematic of the organizational structure of the San Diego: City of the Future initiative. The Technical Committee plus the Policy Committee equal the Mayor's Advisory Committee. As detailed below, the nine policy subcommittees were an outgrowth of the Policy Committee.

The operations of the committee structure are quite extensive since this effort was an exploratory process that developed over the study period.

A summary of the overall approach taken is gleaned from the numerous committee and subcommittee minutes of the City of the Future endeavor and is provided below.

◆ From April until approximately August-September 1993, the MAC held bi-monthly and/or monthly meetings that included all MAC members. These meetings drew on expertise from invited guests from the phone, wireless communication technology, and cable companies; navy surveillance center; the phone company, SANDAG, and the City of San Diego's telecommuting projects; Coronado's Telecenter; Singapore's National Computer Board; a health care information management company; and a Tijuana television station pertinent to assisting the MAC in designing its strategic telecommunications program.

◆ In August, 1993 the Technical Committee identified two specific areas for further study: standards for interconnection and interoperability, and the importance of bringing together key telecommunications technology suppliers and users

◆ Discussion began in August, 1993 to create subcommittees that would be responsible for providing recommendations on actions to be taken. MAC members were sent sign-up lists to encourage their participation on subcommittees and recommendations of experts for addition to the subcommittees.

◆ The MAC held a one day retreat to devise a draft vision statement for the initiative and to develop specific directions and guidelines for the subcommittees. At the retreat the MAC divided into four working groups to craft the vision statement. (The reports of these groups are contained in the minutes from the September 8th retreat.)

◆ The MAC determined that subcommittee reports would contain: (1) information regarding the short term and long term activities in the San Diego area pertaining to each subcommittee area, and (2) recommended actions per subcommittee area for the Mayor, city and county to pursue to demonstrate the value of information infrastructure.

◆ Subcommittees were developed from feedback to the mail request that included the MAC plus experts recommended by MAC for particular subcommittees. Over 100 persons

from more than 70 organizations formed membership in the following subcommittees: health; education; electronic libraries; art,culture, tourism, and entertainment; transportation and telecommunications; emerging industries; border issues; economics, government organization, and decentralization; and law and regulation. In addition to those organizational groups included in the MAC, library and large regional companies were added to the composition of the subcommittees.

◆ The MAC's Technical Committee formed a technical standards and interconnection subcommittee which began meeting in October to investigate issues pertaining to standards and development of a Request for Information (RFI) and RFP for a community-wide broadband information grid.

◆ The MAC's Technical Committee set up an E-Mail service for distribution of committee meeting information and materials over the Internet system in November.

◆ Subcommittee chairs met with the MAC's policy committee to provide status reports on subcommittee proceedings during October and November.

◆ Subcommittees met separately to prepare their reports during October and November.

◆ A meeting was held in December to review the MAC's work to craft a Request for Information (RFI) to get information from telecommunications industries to determine the way to link all constituents in the most timely and cost-effective way via a community-wide grid.

The findings of the subcommittees were compiled into the final report by the Policy Committee. The recommendations are summarized below by committee.

A. MAC Recommendations

◆ Establish a public/private partnership to build a community-wide infrastructure that is accessible, affordable, and compatible.

◆ Issue an RFI to acquire information from the telecommunications industries concerning the most timely and cost effective way to link all constituents in the community.

◆ Develop a Telecommunications Policy Office to serve as a clearing house for telecommunication developments and applications, review

existing telecommunications programs, assist in creating public/private partnerships, increase the use of digital communications wherever possible, connect all government employees in order to streamline service delivery, and fashion a privatization agenda.

◆ Establish a federal/state funding task force, and utilize San Diego's designation as a Regional Technology Alliance to acquire funding.

◆ Identify and reward private initiatives to assist ongoing and developing efforts.

◆ Establish "Life-Site Schools" that serve at ports for integration of health, government and library services.

◆ Create a public/private health care utility link that standardizes information and records.

◆ Launch "Info San Diego", a kiosk-based information service for heavily used municipal documents, guidelines, procedures, planning, economic and other tools that support businesses, on-line dictionaries, libraries, newsletter, directories and library catalogues, geographic information, crime information, census statistics, and arts, culture, tourism, and entertainment information.

◆ Continue San Diego's information infrastructure study effort to: generate widespread awareness, evaluate alternative economic/market structures to deliver telecommunications, assess ability of technology to meet needs, determine how local government can participate in efforts and coordinate with private providers, develop a regional economic impact study of telecommunications, and identify initiatives.

◆ Maximize human resources by determining comprehensive programs in education to assist defense conversions, and determine employee development programs that are alliances between industry and academia.

◆ Blur the borders by reaching out to the greater community in San Diego's development of its information infrastructure, ie. Pacific Rim, North American Common Market.

B.Subcommittee Recommendations

Subcommittee reports and their recommendations are extensive and may be reviewed in their

complete form in the March, 1994 City of the Future report.

OUTREACH EFFORTS

•Expansion of the MAC to include more than 100 representatives from approximately 70 different organizations in preparing recommendations to the Mayor on development of a community-wide information infrastructure.

•Work by San Diego's Economic Development Council to create a plan to educate the business community re information technologies.

10 **CURRENT STATUS**

The final report of the MAC was published in March, 1994. Requests to obtain information on further efforts have been established.
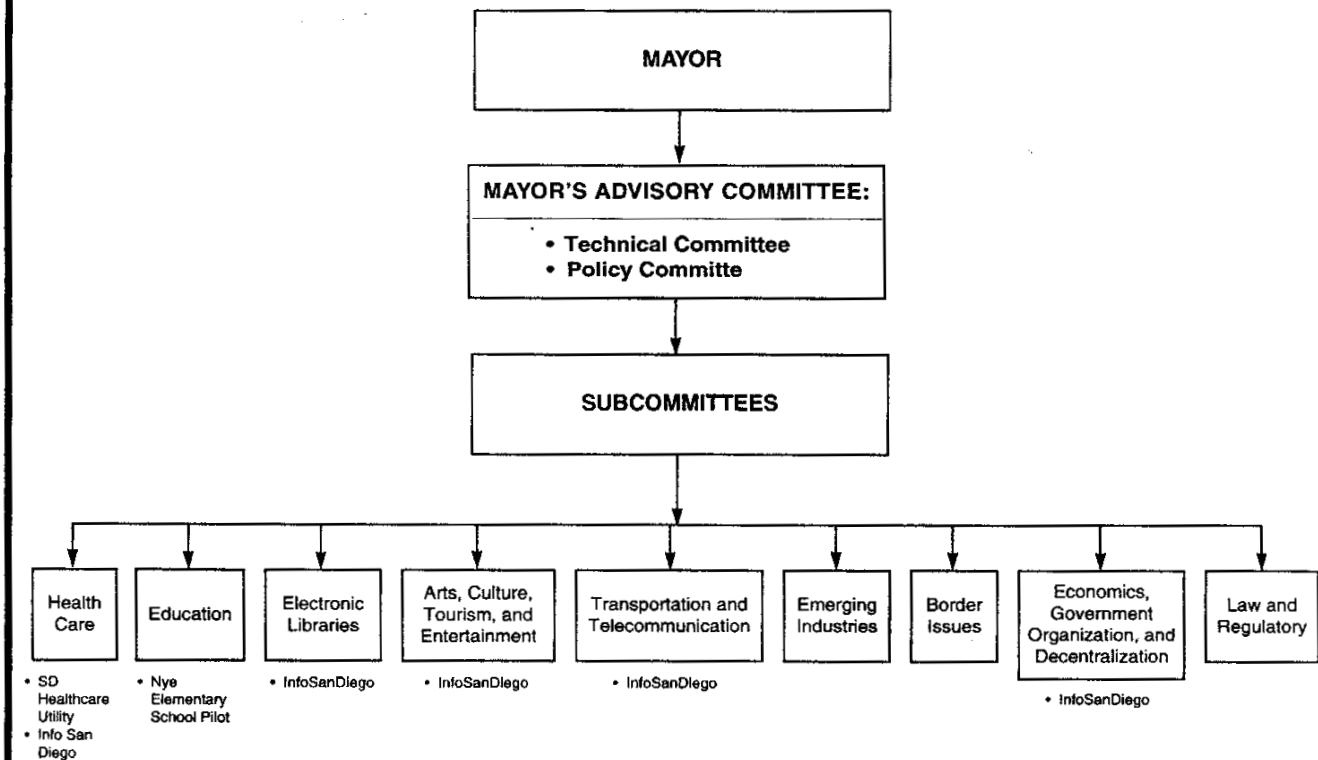
The second phase of the MAC's work is to explore unique and innovative applications in health care, education and government. These efforts have produced a report entitled "Cities of the Future". The report summarizes the Mayor's Task Forces work on four initiatives:

◆ The establishment of "LifeSite Schools" to serve as community centers for the integrated delivery of health care, government and library services to link parents and their children to the schools in their communities.

◆ The development of a "health care utility", a private/public sector cooperative linking hospitals, clinics, physicians, laboratories and imaging centers for routine transfer of standardized patient information and laboratory tests.

◆ The launch of "InfoSanDiego", a universally accessible, PC and kiosk-based information service serving the broadest possible needs of San Diegans.

◆ The establishment of a Privacy and Security Task Force to evaluate concerns regarding privacy and security of the consuming public's use of the new delivery mechanisms, and the threat of abuse by government's use of increasing amounts of information.

The third phase of the MAC's work is to concentrate on developing specific recommendations for private/public joint ventures and for privatization of certain governmental functions or services.

Figure 2

SAN DIEGO "CITY OF THE FUTURE":
ORGANIZATIONAL STRUCTURE

```
                          MAYOR

              MAYOR'S ADVISORY COMMITTEE:

                • Technical Committee
                • Policy Committe

                    SUBCOMMITTEES
```

| Health Care | Education | Electronic Libraries | Arts, Culture, Tourism, and Entertainment | Transportation and Telecommunication | Emerging Industries | Border Issues | Economics, Government Organization, and Decentralization | Law and Regulatory |

- SD Healthcare Utility
- Info San Diego

- Nye Elementary School Pilot

- InfoSanDiego

- InfoSanDiego

- InfoSanDiego

- InfoSanDiego

Net at Two Rivers (N2R)

The Net at Two Rivers (N2R) was incorporated on May 10, 1995 as a 501 (c) (3) non-profit coordinating body that consists of designers, information providers, and end users for the purpose of creating and operating a dispersed, decentralized and inter-operable community electronic network.

1 MISSION

To build community through development and use of a self-sustaining telecommunications and information infrastructure for a 15 county region, representing the urban/rural areas of Greater Sacramento, and the outlying rural areas encompassing North Eastern California and Western Nevada.

N2R's immediate goal is to demonstrate a cost-effective urban/rural program for delivery of literacy services. Delivery of these services is planned via community centers, schools, libraries, government facilities, work places and homes. The literacy objectives include: providing online training for providers of services, access to national and state databases, and enrollment, course work and other end user activities.

2 PERCEIVED BENEFITS

Community-wide benefits expected from development of the N2R electronic network and its associated projects include:

◆ improved quality of life

◆ partnered development to achieve community goals

◆ increased efficiencies in business operations

◆ strengthened ability for business to compete in the global economy

◆ expanded educational access

◆ streamlined costs of healthcare provision

◆ enhanced participatory democracy via interactive communication on civic issues

◆ new markets for technological companies

3 INITIATION

On January 18, 1995, Sound View Productions, a telecommunications firm in the Sacramento area hosted a meeting at KVIA, the PBS affiliate, sponsored by United Way Sacramento, entitled "Sacramento Net". Over eighty organizations, including government, libraries, K-12, higher education, user groups, community based organizations, businesses and information networks, gathered to hear speakers discuss development of a community network.

In February 1995, twenty-five organizations gathered and agreed on the need for a regional community electronic network. From this gathering give common needs were defined. They are the need for:

◆ greater two-way communication within an agency, between agencies, with clients and with the general public

◆ greater information flow to and from the agency

◆ user friendly, universal access to information and communication with attention to diversity among users

◆ an initial content focus on literacy and vocational training to build and maintain a skilled workforce

◆ a self-sustaining 501 (c) (3) non-profit corporation (N2R) dedicated to developing the above and training users on the system

4 COMPOSITION

The Net at Two Rivers (N2R) is composed of more than 50 organizations that represent higher education, K-12, libraries, healthcare, government, existing networks, user groups, local businesses and community-based organizations. Initial members of the N2R Board of Directors represent non-profit, education and health sectors, with additional seats on the Board to be chosen for the business and government sectors.

5 MAJOR GOALS

Net at Two Rivers (N2R) builds community through telecommunications technologies by:

◆ providing valuable information tools for effective community living in content areas such as healthcare, social services, voter participation, economic development, public safety, K-12 and higher education

- providing valuable communication tools for inter-agency and intra-agency interactions

- assisting in making government more accessible

- promoting economic development through community connectivity and improved mobility

- making policy recommendations to government to promote community access and the development of seamless, broad, fast communication lines for moving data and image files throughout the State and the Nation

6 FUNDING

At present organizations are donating staff time equipment and facilities. United Way has absorbed the developing project until funding is secured, providing executive offices, phone, fax and other expenses. Office computers have been donated. Hundreds of dollars in volunteer hours are being logged in by professionals.

7 FUND RAISING

N2R submitted a grant to the National Telecommunications Information Infrastructure Assistance Program, (NTIA's TIIAP), on April 20, 1995. The grant is a literacy and lifelong learning project, N2R-LLL, which extends the work begun by the Outreach and Technical Assistance Network (OTAN) division of the California Department of Education Adult basic education program. N2R-LLL will expand OTAN outreach into new populations of adult illiterates by providing public access to adults who are unlikely to enroll in adult education schools. (OTAN provides on-line information resources, technology training, and communications services via a Gopher, WWW and commercial carrier for the purpose of supporting literacy and language development to over 400 adult schools in California. Recent federal funding via the Adult Education Literacy Act will enable OTAN to expand a prototype for an on-line tutorial for literacy instruction. This prototype will be made available to the organizations participating in N2R).

Over fifty organizations partnered this project and matched the grant request of $1 million with over $1.6 million of their own resources for a combined project cost of $2.6 million. This project requests funds for N2R operation (equipment, connectivity, salaries), connectivity for 10 K-14 district offices in

LATA 3, a rural connectivity/training component, a University of California at Davis research project (distance learning) and a consulting package by an evaluation expert.

Corporate support for N2R is also underway under the direction of the CEO of the Sacramento Chamber of Commerce who has personally volunteered to work on a business plan. The goal is to follow the Smart Valley model of developing funding support from large corporations.

N2R is a member of a coalition which is seeking funding from the Department of Education through a Challenge Grant application which will provide additional resources for five years. The application was submitted by the Sacramento County Office of Education and concentrates on infants, preschoolers and school-age children. lifelong

8 ORGANIZATION AND ACCOMPLISHMENTS

Figure 3 shows the ongoing structural development of the Net at Two Rivers (N2R). As indicated in Figure 3, Sound View Productions provided the initiative that stimulated a series of meetings among participants throughout numerous organizations that led to the formation of the N2R non-profit.

At the present time both the N2R Board of Directors and the N2R program committees are being expanded from education, health and government/community to six categories and Board members. The added components are small business, nonprofits, and corporations.

The primary accomplishments to date have included N2R's considerable work to advance literacy development via grantsmanship.

9 OUTREACH EFFORTS

The Co-Executive directors of N2R direct monthly public meetings that are attended by members of the participating organizations. In addition, they attend conferences and provide talks to community groups to market the concept of N2R and its goals.

N2R is strategically moving from grant funding activities into active involvement with the corporate community. The organization is coordinating information and communications needs with the business community that include a variety of cost

saving and networking aspects of telecommunications.

CURRENT STATUS

◆ Pending action regarding submission of N2R's NTIA grant.

◆ Continuing expansion of N2R's Board of Directors and program committees.

◆ Increased outreach to bring corporate involvement within the N2R umbrella.

REFERENCES

Cities of the Future: Report of the Mayor's Task Forces on InfoSanDiego, Health Care, Privacy, Security and Intellectual Property, and Education, International Center for Communications, College of Professional Studies and Fine Arts, San Diego State University, June 1, 1995.

Net At Two Rivers: Project Purpose and Scope, Barb Englund and Cynthia Mulit, Co-Executive Directors, Sacramento, CA, June, 1995.

San Diego: City of the Future, The Role of Telecommunications, Report of the Mayor's Advisory Committee on the City of the Future, International Center for Communications, San Diego State University, March, 1994.

Smart Valley, Inc., http://www.svi.org, revised March, 1995.

Figure 3
NET AT TWO RIVERS (N2R):
ORGANIZATIONAL STRUCTURE

```
                SOUND VIEW PRODUCTIONS
                          |
                          v
               TELECOMMUNICATION
             INFRASTRUCTURE MEETINGS
                          |
                          v
               N2R BOARD OF DIRECTORS
                          |
                          v
               N2R PROGRAM COMMITTEES
                          |
```

Small Business	Nonprofits	Health	Education	Government and Community	Corporations
			• N2R LLL	• Davis Community	
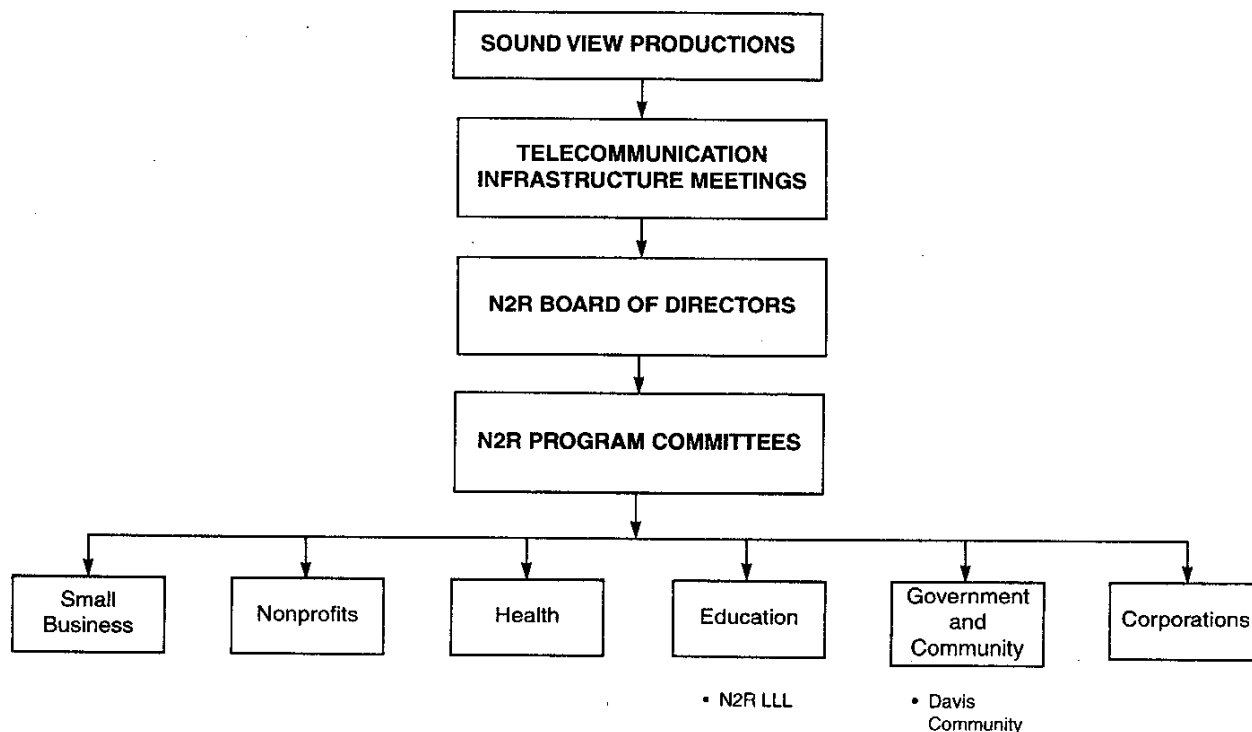
Work Place Wire

Alternative Work Place Strategies for

INFORMATION MANAGEMENT PROFESSIONALS

Supporting Your Telecommuter's Technology

by Robert Moskowitz
President
American Telecommuting Association

Whether your organization is doing it to cut the costs of maintaining bricks and mortar, to give key workers the scheduling and travel flexibility they want, or to gain any of the other "win-win-win" advantages of telecommuting, at some point top management will turn to you as the Information Systems Manager and ask: "What's it going to take for us to support these people as telecommuters?"

What Services?
Your first step is to determine exactly what services the telecommuter needs. Strictly speaking, telecommuting has little – if anything – to do with technology. The top executive who stays home to craft a proposal or re-work a major presentation is telecommuting – and he may not even use a phone!

But if a telecommuter benefits from using technology when he or she is working in the company's offices, then he or she may also benefit from using some or all of that same technology when working away from the office as a telecommuter.

In practice, this may mean anything from

"Once you know what applications you need to support, then you can think about the best ways to do it."

providing an extension of your company's telephone system at the telecommuter's remotely located office, to providing fax service, dial up or dedicated computer connections to the office network, and even two-way video conferencing.

E-mail service is very common, very useful, and very easy to provide – either as an extension of your office network e-mail or through a separate dial-up account on AOL, CompuServe, or the Internet.

Once you know what applications you need to support, then you can think about the best ways to do it.

Phone Service
Most telecommuters who want to maintain a professional image, at least, if not office-quality telephone capabilities, have a second telephone line installed at home (or a private line installed at the telecommuting center where they'll work).

Then at the least people can dial this number and get a professional sounding response instead of a generic hello or the sweet sounds of two-year old gurgling into the telephone.

Depending on the capabilities of your company's telephone system, you can often have the telecommuter's regular office phone forwarded to this remote line. This way, you not only provide the telecommuter with some or all of the extra telephone capabilities –voice messaging, call waiting, conferencing, and so forth - he or she finds at the office, but everyone who calls this person can call just one number every day and needn't know or be concerned about what days the telecommuter works at which different locations.

(In more and more areas, a new "follow me" or "500" service from the local Bell Operating Company makes it possible for the telecommuter to have a single number ring on whatever phone he or she happens to be near.)

In some situations, you might want that phone line in the telecommuter's remote work location to be ISDN (Integrated Services Digital Network). Although more expensive than regular analog phone lines, a single ISDN line can support simultaneous combinations of a phone, a fax, and a computer. Two ISDN lines are enough for two-way, full-motion video teleconferencing.

Computers

Before you worry about the technical aspects of computer connections to the telecommuter's remote office, think instead about the overall business applications. Exactly what work will the telecommuter be doing? Exactly what hardware and software will he or she require? Once you have that written down, you can begin to assess the computer requirements more precisely.

Many computer-based telecommuters like to have a computer at work and another at home, both capable of connecting to the office network so files don't have to be carried from one location to the other on disk. But more and more others are finding it more effective to have a single lightweight laptop they use at home, while telecommuting, and also while traveling.

With wireless or cable connections to the office network, it's easy to keep the files on a laptop in synch with the files other people are using. An even if you don't have ISDN, a 28,800 bps V.34 modem allows you to pump quite a bit of data over a regular telephone line.

Fax Capabilities

Faxing documents is one of the most common ways for telecommuters to keep in touch with others around the world. For a fixed work location at home, a multi-purpose machine is very useful. Such machines send and receive faxes, copy, and print on plain paper. Many also work as a scanner, and in minutes can be configured to forward incoming faxes right into an attached PC. Another approach is the fax-modem, a device that literally allows the telecommuter's computer to generate print-outs in almost any office in the world!

In The Office

All you need for most of these connections is a gateway device. This includes both software and hardware, and is basically a computer running special software and fitted with an Ethernet card for your network and with a modem that connects to an outside line. Network packets go through the gateway in both directions enroute to and from people using the network, including telecommuters dialing up to the modem line.

If you're supporting a great many telecommuters, you might need a bank of modems to receive their dial-up connections. The rule of thumb is to have one modem for every eight telecommuters, but this varies greatly depending on how many hours each one needs to be on-line. Your internal PBX or central office service can provide a rotary connection so all telecommuters dial a single number, and are automatically switched onto the next available modem. Such hardware and the proper software also enable something called "document conferencing," which is simply a process that lets two or more people edit the same data file simultaneously from whatever computer they happen to be using.

Another neat device is the MultiMux, from MultiTech Systems of Mounds View, Minnesota. It provides a virtually invisible telecommunications connection between a telecommuter and his or her headquarters office, combining voice, data, and fax through a 28,800 bps modem over a standard telephone line. Once connected, the MultiMux transforms the telecommuter's phone – wherever it is – into a highly secure station on the office's telephone network, giving telecommuters all the same services and capabilities they have when working directly in the company's office, and transferring all toll charges onto the regular office bill.

Conclusion

The level of technical support necessary to support a telecommuter should be based upon the job duties of the telecommuter and various applications necessary to fulfill those job duties. The exact mix of telecommunications ser-

vices, hardware and software will vary from one telecommuter to the next. Generally, the level of technical support necessary is less than you might think. Only the most sophisticated telecommuters might require video teleconferencing, remote access to the office network and similar services. Through appropriate analysis, the Information System Manager and staff can provide good technical support to company telecommuters. ■

Robert Moskowitz is a business consultant based in Woodland Hills, CA, who writes frequently on productivity, office automation and technology. He is President of the American Telecommuting Association, a membership organization serving the needs of telecommuters and those who want to become telecommuters.

Resources

Manuals

Telecommuting: A Formula for Business Success
Telecommuting: A Formula for Business Success is part of the *Workplace Wire* program for Southern California scheduled for publication in June, 1996. This is a two volume step-by-step telecommuting and alternative office implementation manual. Volume 1 covers how to select telecommuters, what to include in your policy document, and how to evaluate a program. Volume 2 is a training guide that includes a complete curriculum with exercises, overheads, and handouts.

To Order your advance copy: Contact the Metropolitan Transportation Authority, (213) 922-2811.
Price: $39

Managing People You Can't See
by Donna Wolverton
Managing People You Can't See is a performance management self-study guide for managers of telecommuters. This thorough manual walks managers/supervisors through the process of defining objectives for employees, identifying work actions, and establishing good communication feedback procedures. Worksheets are included.

To Order: Contact Donna Wolverton, 4608 Glencoe Ave., Suite 5, Marina Del Rey, CA 90292-6347, (310) 822-4157
Price: $18.95

Telecommuting Implementation Manual
by Midwest Institute for Telecommuting Education (MiTE)
This manual provides ideas and steps to implementing a telecommuting program within your organization. It also examines equipment, employment laws, liability issues, and ways to resolve them. The manual includes worksheets. It draws on the

expertise of over 50 companies.

Contact: MiTE at (612) 463-3146 or Fax (612) 879-5400
Cost: $95.00

Periodicals

Telecommuting Review
by Gil Gordon Associates
Written for employers and vendors, *Telecommuting Review* is a monthly newsletter covering telecommuting progress since 1984. Public and private sector firms can gain ideas and solutions for beginning or expanding successful telecommuting programs.

To order: Contact Gil Gordon Associates, 10 Donner Court, Monmouth Junction, NJ 08852, (908) 329-2266. World Wide Web site: http://www.gilgordon.com/.
Price: $177 annually

Videos

It's About Time
by Pacific Bell
It's About Time is a short video that provides an overview of telecommuting. Shown are the benefits of telecommuting and a depiction of the many jobs for which telecommuting is viable.

To Order: Contact Pacific Bell (800) PACBELL

Conferences/Seminars

Telecommuting World Conference - "Effective Technology and Productive Practices for Dispersed Offices and Mobile Workers"
September 9-11

Telecommuting World is a new Conference and Exhibition that explores distributed work practices in the real business world. The conference program is for senior-level managers and other professionals in small to mid-size companies (10-1,000 employees) seeking practical guidance on how to explore, initiate or expand telecommuting as a response to business opportunity. The program includes workshops, seminars, and case studies that will enable conference participants to learn how to design, implement and manage telecommuting with the goal of solving immediate problems. The conference will also provide conferees opportunity to gain the insight and skills needed to steer around the pitfalls of telecommuting.

Where: San Francisco Hyatt RegencyContact: Kit Hamilton, Comtek International, (203) 834-1122

Technologies That Support Telecommuting
May 30, 9 a.m. - 12 p.m.
Using live demonstrations of video conferencing and the

Internet, including the World Wide Web and electronic mail, this seminar will provide an overview of popular technology that offers numerous benefits for telecommuting. This is just one of six different seminars to be offered by the Southern California Telecommuting Partnership (SCTP) in May, June, and July of this year. Call them for complete information on all seminars.

Where: Los Angeles Chamber of Commerce, 350 South Bixel Street, Los Angeles, CA
Contact: Southern California Telecommuting Partnership, (800) 6INFOHWY (800-646-3649)
Price: Free

GTE University. Where It All Falls Into Place.

Universal City, May 29 or May 30
Long Beach June 27
This one day seminar addresses real-world telecommunications needs of business and technology managers. Courses will provide live, hands-on demonstrations that show meaningful applications. They have courses in five areas.

1) FUNDAMENTALS includes courses in LAN, Voice and Wide Area Network fundamentals (CIOs and other business managers who need general knowledge of the issues);

2) COMPUTER/TELPHONY INTEGRATION offers practical insights into joining together voice, video, and data onto one line;

3) CLIENT/ SERVER COMMUNICATIONS provides technical managers with solutions for interworking, multimedia, and high-speed LANs and WANs;

4) APPLYING THE TECHNOLOGY explores community-based networks, wireless communications, and integrated networks;

5) DISTRIBUTED NETWORK SOLUTIONS addresses the challenges and opportunities of remote access and telecommuting, the Internet, and a variety of real-world applications.

To Register: Call 1-800-227-4374
Price: Free

TO:

WorkPlace Wire
NEWSLETTER

FAX: 213-922-2849

Evaluation Survey

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_____

Thank you. Please fax your responses to the number above.   *MIS*

Work Place Wire

Why Less Is More: Telecommuting as a Facilities Strategy

by Gil E. Gordon
Gil Gordon Associates

I suppose it's risky to suggest to Southern California facilities directors that the ground is shifting under their feet - but I'll do it anyway. It's the best way to describe the fundamental change you are facing in how and where the employees in your organizations work. Fortunately, this is one time when you can have a lot more control over this kind of major movement – and with the right planning, you can make sure it has a positive, not a devastating, outcome.

Since 1982, I have never seen a concept catch on as quickly as is happening today with the link between telecommuting and facilities management. This qualifies it as a trend, not a fad, and strongly indicates that our thinking about office design and space planning will never be the same.

> *"...space and buildings you own or lease may in fact be a liability, not an asset."*

How We Got Where We Are

Telecommuting's relatively short history (approximately 20 years) has been marked by much more talk than action about the space-savings potential. It was a "weather" issue – just about everyone talked about it but nobody did anything about it. This was true for four reasons:

TOO LITTLE USE: The general timidness with which most employers used telecommuting meant that the numbers just weren't right; not enough people were working away from the office for enough days to even consider any kind of space-planning impacts;

TOO FEW TOOLS: The technologies for mobile work weren't well-enough developed to allow large numbers of employees – especially in areas such as field sales – to work effectively away from the office for much of the week;

TOO FEW OPTIONS: The concepts of non-territorial offices and hoteling, among other alternatives, were not widely known or understood; the "open plan" office was, for many employers, the extent of innovation – and even that was not widely accepted or welcomed;

TOO FEW OPTIONS: When it came to cost-cutting, the tried-and-true (and, in many cases, the tried-and-failed) approach of cutting staff was the first method most CEO's reached for. The rush to downsize staff yields terrific short-term results, but as we're seeing now, there can be long-term consequences. Nevertheless, it seemed (and probably still seems) "normal" to cut back on costs by cutting back on headcount.

I'd argue today that these four obstacles have been (or at least are being) removed. Most important, perhaps, is the last one: CEO's (and Wall Street, and the White House) seem to be to be waking up to the fact that downsizing staff isn't all it was cracked up to be. There is a growing awareness that firms can look at the near-sacred "crown jewels" of the headquarters and other buildings as the source of big cost savings – and in doing so, are realizing that the space and buildings you own or lease may in fact be a liability, not an asset.

One reason this is becoming clear is that research done by Prof. Frank Becker and his team at Cornell University, and by others, shows just how underutilized the office is for most knowledge workers. In many cases, their desks and offices are used roughly one-third of the time - which means that the very expensive asset we call "the office" underperforms by two-thirds. In today's business climate, that's simply unacceptable.

What Should You Do?

For starters, it's easier to say what you shouldn't do as you try to capitalize on all these changes: it's a mistake to get greedy about space savings, and that's exactly what some firms seem to be doing. This greed is based on some math with good results but bad logic. "If we can save $2 million by having 20% of our workforce out of the office two or three days a week," the argument goes, "that means we can save $10 million if we send everyone home two or three days a week." Sorry, but it's not that simple: few firms can send "everyone" home two or three days a week, and his or any similar number-crunching is as short-sighted as is overly-aggressive staff cutting.

Here are some suggestions that should work out much better:

1. FIND ALLIES - Some of the most impressive alternative-officing projects I've seen came from synergistic, and in some cases, unusual, partnerships in organizations. This isn't an issue that can be tackled by the facilities manager alone; you have to carefully choose your allies and come up with a coordinated effort.

Among the potential allies are: human resources (concerned with recruitment and retention, and employee effectiveness); line managers (concerned with getting the work done, managing their budgets, and "doing more with less"), sales/marketing (concerned with providing better customer service and jumping ahead of the competition), and finance (concerned with what finance people are always concerned with). This is truly a case where two, or more, heads are better than one – if for no other reason than a coordinated effort spreads the workload and shows the CEO that this isn't any one function's pet project.

2. SOLVE PROBLEMS, DON'T SELL - You aren't likely to get your CEO's support if you pitch telecommuting or any other officing alternative as the "fad du jour". In other words, don't let yourself be seen as selling a solution in search of a problem. My rule of thumb is to focus on the "3 a.m. test" – assume you walked into your CEO's bedroom at 3 a.m. and woke him/her up and asked, "What are the three biggest problems facing this organization today?"

I seriously doubt that any CEO would include on that list, "Gee, I've really been struggling with how we can do more telecommuting." You know, or should know, what's on your CEO's list – so find a way to credibly link officing strategies to one of those problems.

3. BE REALISTIC ABOUT VACANCY AND LEASES - Office space that you own or have under lease isn't like most other com-

modities - you can't easily send it back to the manufacturer, sell it off at reduced prices, or otherwise make it (and the associated costs) go away. Even if you do manage to free up some space via telecommuting, it's not likely you'll be able to lease or sub-lease that space for top dollar – unless you're in a market where the vacancy rate is well below the national average.

This simple fact has been the undoing of some otherwise inspired space-related alternative officing projects. Aggressive plans to turn out the field sales organization en masse, and shut down dozens of branch offices around the country, can hit the brick wall of reality when employers find they can only effect these changes as their leases expire.

The characteristics of your local market, your relationship with your landlord, the suitability of your space for other uses, and the terms of your lease are among the factors to consider when you're figuring out just how quickly those millions in savings might drop to the bottom line.

4. DO THE RIGHT MATH - Speaking of figuring out the numbers, be sure you take an all-inclusive view when you build your spreadsheet. The direct costs of putting a roof over employees' heads are obvious, but there are some indirect costs to consider as well – many of which won't normally be in your budget. For example, fewer people in the office may mean less need for parking, less security staff, less cafeteria subsidy, less child-care center staffing, one fewer elevator running, etc. These indirect costs don't fall in direct proportion to the number of telecommuters or virtual-office workers – and in some cases might not fall at all. Just be sure you're looking at more than the square footage involved - that's only part of the picture.

5. THINK CREATIVELY ABOUT "OFFICING" - As you may have read in other issues of The WorkPlace Wire, there's an ever-increasing range of alternative officing options available. Telecommuting is just one of them, and even that takes several forms. We're starting to see lots of experimentation with office alternatives even for people who come to the office five days a week – the goal of which is to carefully but deliberately challenge, if not end, the implicit promise that every employee is constitutionally

guaranteed to 143 square feet of space with his or her name on it. While it might be nice to slash your facilities needs and costs by one-third or more, the reality is that most organizations won't achieve that kind of savings – unless they use slash-and-burn strategies for cutting space that are likely to be as dysfunctional as what happens when the same is done to cut staff.

6. DON'T REINVENT TOO MUCH - There's a wealth of information available about alternative officing methods and implementation, so you don't need to start from scratch. Industry groups such as IFMA and IDRC are good places to start, and don't overlook the leading office furnishing vendors and design consultants either. Last but not least, the World Wide Web is a good research resource as well.

7. LOOK FORWARD, NOT BACKWARD - One of the big challenges in facilities planning has always been to figure out how much the organization itself will change so you can figure out how much the space that organization needs will change. This has never been an easy task, and it's not going to get any easier.

Not only are you dealing with changes in the products and services your firm offers, but you're also trying to figure out who will do the work (i.e., your own employees? your outsourcing partner? your "virtual organization"?) and where that work will be done (i.e., in your offices? at a telecommuting center? at employees' homes? in employees' cars? in executive-suites offices?). Unfortunately, this problem isn't going away – welcome to the late 1990's.

One thing is for sure amidst this uncertainty: you probably can't extrapolate from the past – even the recent past – to the future. You can, however, assume that you will have the option, if not the obligation, to consciously under-plan and under-build for the future. That is, you're going to assume that some portion of the workforce will always be in motion, so that you'll need anywhere from 5% to 20% less space than you'd need if everyone was in the office at the same time. This makes for a very attractive space planning graph, because you can put a dollar value on all the space you won't need over the planning horizon.

8. MONITOR AND EVALUATE - Trying to evaluate how you've done with your facilities planning in the context of telecommuting isn't easy, but you have to give it your best try. The evaluation criteria include measures of employee attitudes, performance, and retention (all of which are, of course, affected by factors other than just space) and also, more important, the assessment of your customers. Organizations that have tried to go too far too fast with alternative officing have found, perhaps to their surprise, that customers feel the pain as much or more than their own employees. The mobile worker who becomes too mobile may not be able to deliver quality service to key customers; what these organizations save on space they may lose in sales or goodwill.

Is Less More? Stay Tuned

Can your organization actually do more with less space? Can your

employees adapt to a work model where the office becomes a place to work, not the place to work? And can we make sure that we use telecommuting and other workplace alternatives in ways that truly are "win-win" solutions? The truth is, the jury's still out. We're now entering a period of much more rapid growth in telecommuting, not only in Southern California but almost everywhere. The challenge is to find the right way to balance costs, space, technology, design, employee preferences, customer expectations, and competitive demands.

Feel that ground shifting yet? ■

Gil Gordon heads Gil Gordon Associates, a consulting firm in Monmouth Junction, NJ specializing since 1982 in implementation of telecommuting and the virtual office. He conducts the annual TELECOMMUTE conferences, and works at home when he's not traveling the globe telling other people how to do likewise.

Resources

Conferences

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September 9-11
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Where: San Francisco Hyatt Regency
Contact: Kit Hamilton, Comtek International, (203) 834-1122

Making Telecommuting a Part of Your Workplace

June 18 or July 16
This workshop will lead participants through telecommuting program design, implementation, and evaluation. Key topics will highlight issues such as winning management's approval, maintaining communication, and delegating work responsibilities. This is just one of six different seminars to be offered by the Southern California Telecommuting Partnership (SCTP) in May, June, and July of this year. Call them for complete information on all seminars.

When: June 18, County of Ventura Offices, 800 South Victoria Ave., Ventura, CA;
July 16, Long Beach Telecenter, 3447 Atlantic Avenue, Suite 220, Long Beach, CA
Contact: Southern California Telecommuting Partnership, (800) 6INFOHWY

Books

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Price: $39

The Underground Guide to Telecommuting

Chapter 2 "Command Central: The Virtual Office"
by Woody Leonhard
The Underground Guide to Telecommuting: Slightly Askew Advice on Leaving the Rat Race Behind is an entertaining book that is chock full of practical information and clear explanations of technical issues related to setting up a home office. For facilities departments, it makes a valuable reference book for suggestions to home telecommuters for setting up a home office that includes an appendix complete with vendors who offer hardware, software, or service - name, phone numbers, and fax numbers. Leonhard makes technical information accessible and easy to understand for the lay person.

The book gives a telecommuter's perspective – one who will be planning to telecommute most of the time and sets up a home office. The chapters are self contained units that cover the virtual office, PCs, communications equipment, telemployees, telebosses, becoming an independent worker, taxes, laws, and accounting, and more.

Publisher: Addison-Wesley Publishing Company, 1995,
(617) 944-2700.
Price: $24.95

Managing the Reinvented Workplace

by William Sims, Michael Joroff, and Franklin Becker
This report addresses common challenges and issues faced by companies creating and managing all types of alternative workplace strategies. It discusses specific practices for managing team environments, non-territorial offices, home-based telecommuting, telework centers , and virtual office programs. Findings and recommendations are based on case studies of more than 25 leading-edge organizations.

Publisher: International Development Research Foundation, 35 Technology Parkway, Norcross, GA 30092, (770) 446-8955 ext. 40
Price: $99.95

Associations

American Telecommuting Association

The American Telecommuting Association (ATA) is a membership group that provides a handbook, newsletter, discount purchasing, and other services to people who presently are telecommuters, or who would like to be. They can be contacted at: American Telecommuting Association, 1220 L St. N.W., Suite 100, Washington D.C. 20005, by telephone at 800-ATA-4-YOU (1-800-282-4968), or by e-mail at "YourATA@aol.com".

Periodicals
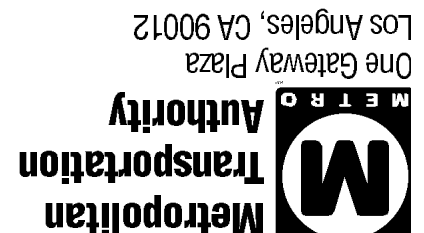
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TO:

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NEWSLETTER

FAX: 213-922-2849

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_____

Thank you. Please fax your responses to the number above.   *FAC*

WorkPlace Wire

Alternative Work Place Strategies for YOUR BUSINESS

Acceptance

by Robert Moskowitz
President
American Telecommuting Association

Previous issues of the *Workplace Wire* have focused upon the changing nature of the workplace and upon case studies of real companies using alternative workplace strategies to improve their bottom line. As a business owner or executive, you need to understand how organizational factors and corporate culture accommodate changes associated with a distributed work force. With years of experience under our collective belt, it's now possible to look back and begin to see the stages of development through which telecommuting grows in a typical organization.

These stages include the tentative first steps of individual telecommuters or pilot programs, followed by relatively elaborate formal arrangements for relatively few telecommuters, then a phase of accelerating growth in the number of telecommuters and the scope of their responsibilities, and finally an acceptance or "end-stage" phase.

Let's look at each of these stages in a little more detail:

Stage 1: Tentative first steps

Few organizations are formed with the idea of relying on telecommuters. Instead, the

> *As a business owner or executive, you need to understand how organizational factors and corporate culture accommodate changes associated with a distributed work force.*

tendency is to expect people to show up for work every business day, and stay until they've "finished for the day."

But under the pressure of increased costs, more complex workforce requirements, accelerating time frames, shortening delivery schedules, and urban sprawl, in the past decade or two most organizations began looking hard for new ways to operate more cheaply, flexibly, and productively. Many found a good answer in the realm of telecommuting.

If management had a relatively far-sighted outlook, they tended to push the organization toward telecommuting by commissioning one or more pilot programs. Although these might not be widely publicized within the organization, even at this early stage there is almost certainly a group of pro-telecommuting managers somewhere within the organization. And this group's knowledge and energies can be tapped to help the organization advance toward later stages of development.

If management had a relatively short-sighted outlook, they tended to do very little and instead allowed individuals to pull the

organization into the modern age by insisting on telecommuting and -- whether because of their status or indispensability -- making their demands stick. These individuals, or "guerrilla" telecommuters, might not be visible to the vast majority of employees. But they are slowly and surely laying the groundwork for later advances in the organization's acceptance of telecommuting.

In any case, year after year of successful telecommuting tends to yield enough tangible benefits for almost any organization to recognize this modular mode of working as a viable business tool. From here, it's easy to move toward the second stage of telecommuting development.

Stage 2: Relatively elaborate formal arrangements for relatively few telecommuters

Once an organization has tasted the fruits of telecommuting –higher productivity, lower costs, more satisfied and loyal employees, greater flexibility and creativity, easier recruiting, lower workforce turnover, and so forth – it's very difficult to renounce any further refreshment.

The natural consequence, in fact, is to expand the number of telecommuters within the organization. In most organizations, however, there remain a core group of managers or supervisors who resist too fast a shift to any new paradigm of employment, and who therefore counsel a "go slow" attitude toward telecommuting, as well.

In most cases, the manifestation of these opposite forces is the construction of elaborate safeguards against any imagined abuse of telecommuting privileges, but the willingness to approve more and more telecommuters who will work under these safeguards.

That's why you'll frequently see 10 to 30 person pilot programs expand during the following year or two to "roll outs" or expanded pilots involving 50 to 200 telecommuters. In very large organizations, each division can have one or more telecommuting "programs" of this size.

This second phase can last a very short time – six months or a year – or a very long time – five to ten years. The time frame depends roughly on several factors, such as:

Profitability – when the organization is making a lot of money, it doesn't feel the urge to break new ground just to cut costs. So it can sustain a workforce that commutes physically (physicommuters) a while longer than a comparable but relatively unprofitable organization.

Flexibility – when top management is willing to entertain new ideas and new work methods, telecommuting gets a fair hearing

and a real-life trial far sooner than when top management is resistant to change.

Size – smaller organizations are more likely to listen to the demands of individuals who want to telecommute, but larger organizations are more likely to have a full-time staff of facilities managers, transportation coordinators, or others whose calculations unwaveringly reveal how much the organization can save or profit through large-scale workforce telecommuting. What's more, these multi-million dollar savings or profits have a mind of their own, and tend to persuade management that this crazy, new-fangled approach to employment makes a lot more sense than anyone previously might have guessed.

Industry – banks, insurance companies, software companies, sales organizations, and other "symbolic analysis" industries are recognizing the advantages of telecommuting and switching to this new work paradigm far faster than hospitals, schools, publishers, law firms, and other organizations that rely heavily on in-person meetings to build consensus and push work toward completion.

Other Factors – fads and short-term pressures tend to promote telecommuting for secondary reasons. For example, when clean air legislation was in vogue, telecommuting was one of several dozen methods an organization could use to help it meet the stringent requirements. Now that downsizing is in vogue, telecommuting provides an extra way to reduce corporate commitments for real estate and other infrastructure.

Stage 3: Accelerating growth in the number of telecommuters and their scope of responsibilities

At a certain point, the organization reaches a third stage of acceptance. Here it begins to create telecommuters faster than it adds new positions. Sometimes, this trend often begins when the organization comes under new financial pressures to drastically reduce costs. Other times, it commences when upper layers of management suddenly recognize the major productivity and other advantages that telecommuting has been delivering, and actively seek to realize more of them.

Whatever the reasons, the organization experiencing this third stage of development in telecommuting growth begins to transform itself from an organization primarily comprised of physicommuters, but with a few telecommuters, into a more flexible organization where telecommuting and physicommuting are merely two interchangeable approaches to the same end: maximum productivity.

In addition, the organization stops limiting the telecommuting option to relatively "isolated" workers like key-punchers, sales staff, and computer programmers. Now top management accepts the advantages of telecommuting for many more positions with much broader responsibilities. Supervisors, team leaders, support staff, and professional staff all find themselves eligible to become telecommuters.

Organizations in this third stage often begin planning for additional telecommuters in years to come. They plan on using less office space and other facilities-oriented resources for a given number of employees. They offer telecommuting as an option to ever-larger numbers of current employees. And they re-organize and re-define more positions to permit and support telecommuting.

At this stage, a willingness to telecommute can begin to become a positive attribute that management actively appreciates in its new hires. An insistence on telecommuting often stops being a barrier to success within the organization. And a resistance to approving or supervising telecommuters may begin to show up as a black mark on a manager's record.

Stage 4: Acceptance

Organizational acceptance of telecommuting probably contains many nuances we have not yet noticed, simply because we don't have enough years of experience to recognize the subtle distinctions. But whatever the various shadings, organizations that have reached the acceptance stage are uniformly supportive of their telecommuters' individuality.

In practice, organizations at this fourth stage of development are willing to listen to telecommuters who want to spend more time -- or less time -- in the company's offices. They freely negotiate telecommuting agreements that meet the needs of each person, as well as the basic policies and objectives of the organization. They remain flexible enough to grant telecommuters frequent, small changes to their basic working pattern and responsibilities. And they stay focused on ends, rather than means, so that individuals can generally find enough freedom within the organization to make their best contributions both while telecommuting and while physicommuting to work. ▪

Robert Moskowitz is a business consultant based in Woodland Hills, CA, who writes frequently on productivity, office automation and technology. He is President of the American Telecommuting Association, a membership organization serving the needs of telecommuters and those who want to become telecommuters.

Resources

Conferences

Telecommuting World Conference - "Effective Technology and Productive Practices for Dispersed Offices and Mobile Workers"
September 9-11

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Where: San Francisco Hyatt Regency
Contact: Kit Hamilton, Comtek International, (203) 834-1122

Books

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To Order your advance copy: Contact the Metropolitan Transportation Authority, (213) 922-2811.
Price: $39

The Virtual Corporation
by William H. Davidow & Michael S. Malone
The Virtual Corporation is focused at structuring and revitalizing

the corporation for the 21st Century. The book draws on international case studies which illustrate the authors' ideas of change for corporations to remain competitive as customer-driven companies.

To order: Contact Edward Burlingham Books/Harper Business; HarperCollins Publisher, NY, New York. (212) 207-7000
Price: $23.00

Managing People You Can't See
by Donna Wolverton

Managing People You Can't See is a performance management self-study guide for managers of telecommuters. This thorough manual walks managers/supervisors through defining objectives for their employees, identifying work actions, and establishing good communication feedback procedures. Worksheets are included.

To Order: Contact Donna Wolverton, (310) 822-4157, 4608 Glencoe Ave., Suite 5, Marina Del Rey, CA 90292-6347.
Price: $18.95.

Associations

American Telecommuting Association (ATA)

American Telecommuting Association (ATA) is a membership organization that provides information and services for the needs of telecommuters and those who want to become telecommuters. The ATA Newsletter keeps up with current telecommuter issues, trends, and equipment.

Contact: American Telecommuting Association (ATA) 1220 L St. N.W., Suite 100, Washington D.C. 20005, 1-800-ATA-4-YOU (1-800-282-4968), or e-mail: YourATA@aol.com.
Price: $50 annually.

Periodicals

Telecommuting Review
by Gil Gordon Associates

Written for employers and vendors, Telecommuting Review is a monthly newsletter covering telecommuting progress since 1984. Public and private sector firms can gain ideas and solutions for beginning or expanding successful telecommuting programs.

To order: Contact Gil Gordon Associates, 10 Donner Court, Monmouth Junction, NJ 08852, (908) 329-2266. World Wide Web site: http://www.gilgordon.com/
Price: $177 annually.

TeleTrends

TeleTrends. The quarterly journal of the Telecommuting Advisory Council. Available free to members.

To order: Contact Telecommuting Advisory Council (213) 993-6070.
Price: Free for members.

TO:

WorkPlace Wire
NEWSLETTER

FAX: 213-922-2849

Evaluation Survey

WE VALUE YOUR OPINION! This is the final issue of the WorkPlace Wire series for the time being. Please help us evaluate and adjust the program by filling out this evaluation survey and faxing to the number above.

On a scale of 1 to 5: 5 – "Strongly Agree," 1 – "Strongly Disagree," and 3 – "I don't know," please rate the following:

	Strongly Disagree		Don't Know		Strongly Agree
1. The *WorkPlace Wire* provided new useful information	1	2	3	4	5
2. The *WorkPlace Wire* prompted me to attend a *WorkPlace Wire* seminar	1	2	3	4	5
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9. The *WorkPlace Wire* should include information about: _____

_____

10. What I liked most about the *WorkPlace Wire* was: _____

_____

11. What I liked least about the *WorkPlace Wire* was: _____

_____

Thank you. Please fax your responses to the number above.   *CEO*

Work Place Wire

HUMAN RESOURCES PROFESSIONALS

Making it Happen

by Jack M. Nilles, President
JALA International, Inc.

Now that you've decided to think about getting ready to consider testing telecommuting, there are some crucial points to keep in mind as you develop your program and take those first implementation steps.

Telecommuting knowledge is not inherited

Neither telemanagers nor telecommuters are born with the ability. Successful telecommuting takes some training for most people, particularly for those with long experience in traditional organizations. In particular, the management process for telecommuting is materially different from the well-known managing-by-walking-around system. Telecommuters are not walk-aroundable. Therefore, both managers and telecommuters need to develop WIDE (Working-In-a-Distributed Environment) skills, if they don't already have them.

WIDE skills are of two sorts: technology adeptness and management competence. Technology adeptness is important to the extent that your telecommuters' work–or the work that will be done during telecommuting periods–is technology-based. However, keep in mind that a substantial amount of telecommuting is done without much more exotic technology than telephones and, maybe, fax machines. If your telecommuters will use such things as personal computers, modems, printers, ISDN lines, and

"Trust depends both on quality communication between individuals and the mutual knowledge that each party will fulfill his/her working obligations"

the like while they're telecommuting, you need to make sure that they know how to use them effectively; the local guru won't be around to help them if they're stuck at home. More on the technology later.

While lack of sufficient technology expertise can slow things down, lack of management expertise can be fatal to telecommuting. Successful telecommuting is based on trust between telemanagers and telecommuters. Trust is not an overabundant commodity in these days of lean-and-meaning, downsizing, right-sizing, outsourcing, and re-engineering. Trust depends both on quality communication between individuals and the mutual knowledge (based on experience) that each party will fulfill his/her working obligations. During traditional office life, this trust develops as a result of continued face-to-face interaction over some sufficiently long period (typically at least several months, often several years). But, when employees are telecommuting one or more days per week–particularly if the goal is to have them telecommuting the majority of the week–and their supervisors are not in the same locations, then different management techniques are needed.

Specifically, both telemanagers and telecommuters need to concentrate on the results of the work to be performed, not on the performance

process. The job of the successful telemanager is to set out the objectives of the work to be performed, establish the nature and quality of the deliverables, set the schedule, make sure that the telecommuter has the necessary background and tools to do the job–all of this with the telecommuter's participation–and then get out of the way. This objectives-setting cycle must be repeated for every significant telecommuting task until it's second nature to all concerned.

That takes training for most people. We typically insist on separate, formal, half-day training sessions for the telemanagers and telecommuters (and still others for telework center managers). They are formal because it is important that everybody understands the rules and management techniques (a formal agenda helps make sure that nothing is left out). They are separate because different emphasis is required for each group; telemanagers who will not be telecommuting from home needn't spend much time on the details of setting up a home office. The content of these sessions covers the fundamentals of telemanagement–how to decide what's telecommutable; goal setting; scheduling; effective communications techniques; motivating (both self and others)–as well as the nitty-gritty of company telecommuting policies and procedures. We usually also insist on a third session in which the telecommuters and telemanagers get together and mutually structure the first week's (or days' or months') telecommuting agendas.

Although a few half-day sessions may not sound like much, our evaluations of telecommuting projects tell us that it makes a difference where it counts: on employee productivity. It is particularly important to train the managers; where we find negative results it is usually traceable to a manager's ignorance of proper telemanagement techniques.

Get the implementation sequence right

As the Boy Scout motto insists: Be Prepared! Here's the tried and true winning sequence. Planning is important in developing telecommuting. Spend some time imagining all the things that could go wrong in a telecommuting situation and then devise ways to avoid or fix them effectively. Develop a formal plan if the project involves more than a few people, and involve the prospective participants in the planning process. Make sure that the necessary changes to company policies and procedures are at least in draft form. Most important, make sure you (and the boss) know what constitutes success. Why are you trying telecommuting; what are your success criteria? How will you know when you've done it?

If you will be introducing new technology (ISDN, ATM, remote access to LANs, videoconferencing, etc.) as part of the implementation, be sure to test it thoroughly before it gets delivered to the telecommuters. You don't want to be spending time and effort debugging technology when you should be concentrating on the management issues. Remember that not all people are created as telecommuters or telemanagers. Some jobs don't fit; some personalities don't work well in telecommuting situations. Select both the telecommuters and the telemanagers on the basis of their job characteristics and dispositions–all of them should be volunteers. If a manager doesn't feel comfortable about supervising telecommuters, don't force it. Some telecommuters don't want to work from home. Do you have a telework center as an option?

Planning, technology selection and testing, people selection, then training. Training should occur just when everything is ready to go. Once the formal training sessions are completed–and not until–telecommuting should begin.

Despite all the planning and preparation, telecommuting takes some getting used to for many novice telecommuters and telemanagers. If productivity improvement was one of your goals, don't panic if it doesn't happen–or even drops–at first. For the first few weeks or months it is desirable to have the participants attend focus group meetings. The meetings have a twofold purpose: reinforcing the training, and surfacing operational problems. During these meetings you want to find out what's working, of course, but emphasize problem solving: what isn't working as well as expected and how can it be fixed?

Wait a minimum of six months after telecommuting officially begins before you make your first formal impact measurements (of course, you can take them before then, but don't be surprised if you see lots of fluctuations). If you have followed all of the other steps just summarized, then what you had hoped for (higher productivity, improved morale, reduced turnover, happier campers, diminished office space demand) should be appearing. What you were worrying about probably hasn't happened. You have helped create a new type of organization that functions better for the company, the employees, and the community. And it will improve with time. ■

Known internationally as "the father of telecommuting/teleworking,"

Jack Nilles is the founder of JALA International–a management consulting firm that has developed or evaluated telecommuting projects for a variety of Fortune 100 companies.

Resources

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Where: San Francisco Hyatt Regency
Contact: Kit Hamilton, Comtek International, (203) 834-1122

Making Telecommuting a Part of Your Workplace

June 18 or July 16
This workshop will lead participants through telecommuting program design implementation and evaluation. Key topics will highlight issues such as winning management's approval, maintaining communication and delegating work responsibilities. This is just one of six different seminars to be offered by the Southern California Telecommuting Partnership (SCTP) in May, June, and July of this year. Call them for complete information on all seminars.

Contact: Southern California Telecommuting Partnership,
(800) 6INFOHWY
When: June 18, County of Ventura Offices, 800 South Victoria Ave., Ventura, CA;
July 16, Long Beach Telecenter, 3447 Atlantic Avenue, Suite 220, Long Beach, CA

Books

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To Order your advance copy: Contact the Metropolitan Transportation Authority, (213) 922-2811.
Price: $39

Telecommute America! 1995 Educational Seminar Participant Materials

Module 2, 4, & 5 "Planning Your Telecommuting Operation," "Implementing Your Telecommuting Operation" and "Monitoring and Evaluating Your Telecommuting Operation"
by AT&T School of Business
Planning, Implementing, Monitoring, and Evaluating Your Telecommuting Operation, the second, fourth, and fifth module in the Telecommute America! 1995 Educational Seminar Participant Materials Manual provides an excellent workbook overview for key considerations in any alternative workplace strategy. The worksheet checklists walk through assessment and planning for your organization:

1) Is your organization/business ready to support a non-traditional work operation? What jobs are appropriate for telecommuting? Who are good candidates for working non-traditionally?

2) What are the challenges and obstacles that others have confronted? What process allows successful implementation? What is in the telecommuter/supervisor agreement? What are telecommuting skills for managers and employees?

3) Who are key stakeholders? What is the value of pre and post surveys? What are the components of a cost/benefit analysis? How do you measure productivity? The manual provides a range of tools that can be immediately used in planning, implementing, monitoring, or evaluating a telecommuting/alternative office program.

Publisher: AT&T, 1995.
Contact: Ken Radziwanowski, (908) 302-3363

The Virtual Office Survival Handbook

Chapter 11 "Coping with the Psychological Issues of Working Alone" and Chapter 12 "Maintaining Visibility"
by Alice Bredin
The Virtual Office Survival Handbook provides ideas for setting up, surviving, and thriving in the non-traditional work arrangement. These two chapters deal with the common human resource issues encountered when workers are adjusting to feeling isolated and "out of the organizational loop" due to telecommuting.

Publisher: *John Wiley & Sons, Inc., 605 Third Avenue, New York, NY 10158-0012, (212) 850-6000.*
Price: *$16.95*

Telecommuting Implementation Manual

by Midwest Institute for Telecommuting Education (MiTE)

This manual provides ideas for marketing a telecommuting implementation program within your organization. It also examines equipment, employment laws, liability issues, and ways to resolve them. The manual includes worksheets. It draws on the expertise of over 50 companies.

Contact: MiTE at (612) 463-3146 or Fax (612) 879-5400
Cost: $95.00

American Telecommuting Association

The American Telecommuting Association (ATA) is a membership group that provides a handbook, newsletter, discount purchasing, and other services to people who presently are telecommuters, or who would like to be.

Contact: American Telecommuting Association, 1220 L St. N.W., Suite 100, Washington D.C. 20005, by telephone at 800-ATA-4-YOU (1-800-282-4968), or by e-mail at "YourATA@aol.com".

The AT&T Telecommuting Connection(tm) Kit

This kit consists of a videotape and handbook that looks at the forces behind telecommuting. The handbook includes information on how to implement a telecommuting program, sample telecommuting policy, agreement, telecommuter's agreement, and telecommuter and supervisor surveys.

To Order: Contact AT&T at (800) 344-3133

The Telecommuting Zone

by Arizona Department of Administration

This training package includes a video (28 minutes) and a "Facilitator's Guide." The video is intended to be interactive for in-class discussion and workbook exercises. It is divided into 10 modules. Each module deals with a separate issue such as telecommutable and non-telecommutable tasks, organizing the home workspace, and communicating with co-workers.

To Order: Contact John Corbett, Telework Programs Administrator (602) 542-3637, FAX (602)542-3636
Price: $41.

Periodicals

Telecommuting Review

by Gil Gordon Associates

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Price: $177 annually

TeleTrends

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To order: Contact Telecommuting Advisory Council (213) 993-6070.
Price: Free for members.

Southern California **Association of Governments**

METRO

Metropolitan Transportation Authority
One Gateway Plaza
Los Angeles, CA 90012

TO:

WorkPlace Wire NEWSLETTER

FAX: 213-922-2849

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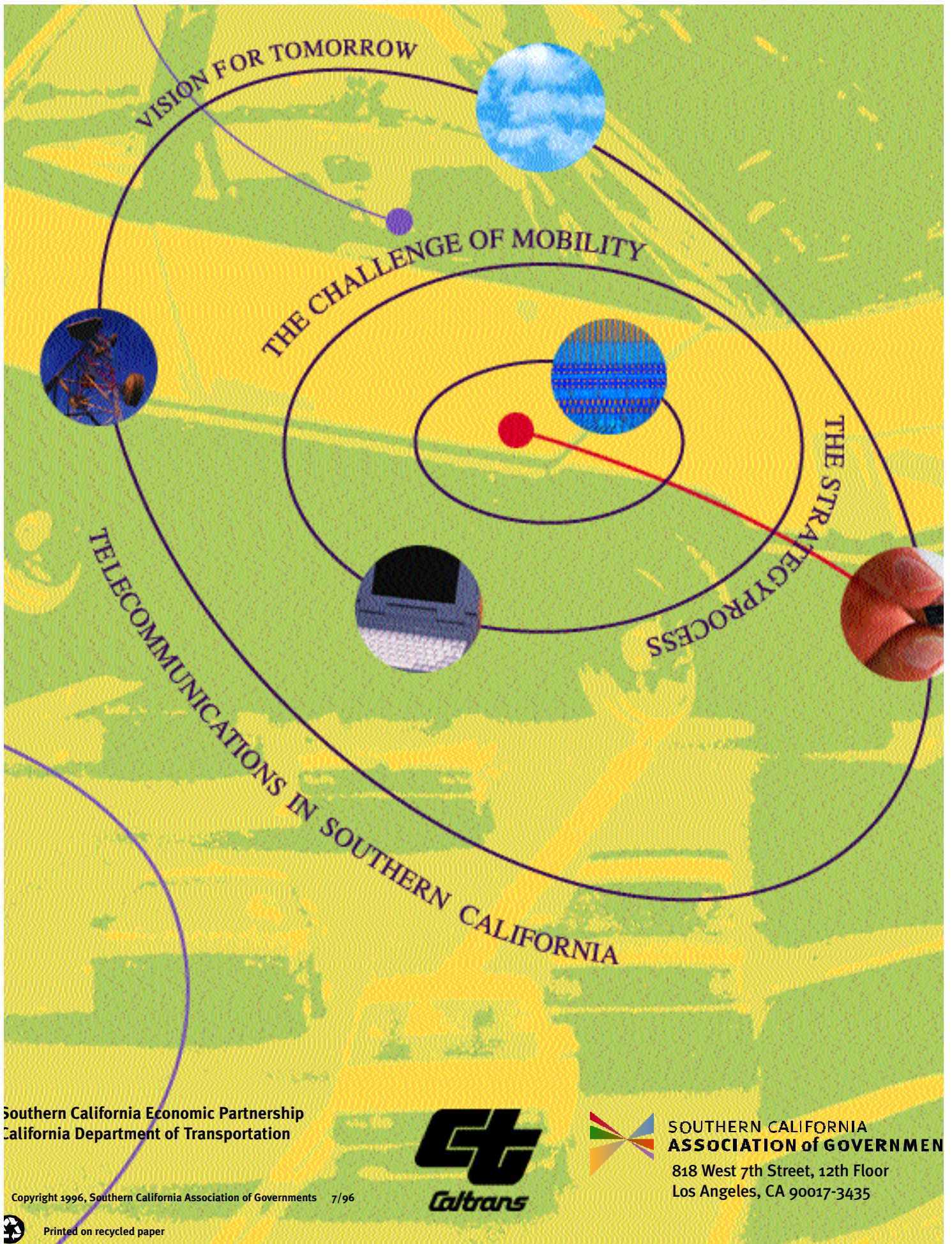|	*Strongly Disagree*		*Don't Know*		*Strongly Agree*
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Thank you. Please fax your responses to the number above.   *HR*

VISION FOR TOMORROW

THE CHALLENGE OF MOBILITY

THE STRATEGY PROCESS

TELECOMMUNICATIONS IN SOUTHERN CALIFORNIA

**Southern California Economic Partnership
California Department of Transportation**

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